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INTERNATIONAL RAILWAY CONGRESS
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XIIIth SESSION

PARIS, 1-11 JUNE 1937.

SUMMARY OF PROCEEDINGS

SUMMARY

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List of the papers published.

NUMBER of the question	TITLE OF THE QUESTION	DOCUMENTS	YEAR, MONTH AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.
		1st Section : Way and works.		
I	The construction of modern track to carry heavy loads at high speeds, and methods of modernising old track for such loads and speeds. Facing points which can be taken at high speeds.	*Report* (France and Colonies, Spain, Portugal and Colonies, Italy, Czechoslovakia, Bulgaria, Rumania, Jugoslavia, Greece, Turkey, Egypt), by H. Flament.	December, 1936, p. 1447.	10
		Report (Belgium and Colony, Luxemburg, Netherlands and Colonies, Denmark, Norway, Sweden, Finland, Germany, Poland, Austria, Hungary, Switzerland), by C. Lemaire.	February, 1937 p. 357.	18
		Report (America, Great Britain, Dominions and Colonies, China, Japan), by T. Yamada and Y. Hashiguchi . .	March, 1937, p. 503.	20
II	Use of welding : (1) to obtain extra-long rails; (2) in manufacturing and repairing points and crossings. (*a*) Results obtained by using extra-long rails. Methods used to ensure safe expansion of the rails and anchoring of the track; (*b*) Technical and financial results shown by welding points and crossings.	*Report* (Germany, Belgium and Colony, Luxemburg, Netherlands and Colonies, Denmark, Norway, Sweden, Finland, Poland, Austria, Hungary, Switzerland), by Dr.-Ing. Müller.	November, 1936, p. 1239.	8
		Report (Great Britain, Dominions and Colonies, America, China, Japan), by George Ellson.	January, 1937, p. 1.	13
		Report (France and Colonies, Spain, Portugal and Colonies, Italy, Czechoslovakia, Bulgaria, Rumania, Jugoslavia, Greece, Turkey, Egypt), by J. Ridet.	January, 1937, p. 171.	16
		Supplement to report, by J. Ridet . .	May, 1937, p. 1485.	...
III	Methodical and periodical maintenance of : (1) metal bridges; (2) signals; (3) metal supports carrying the contact wire on electric railways. — Organisation. — Working methods. — Materials used.	*Report* (Great Britain, Dominions and Colonies, America, China and Japan), by Wm. A. Fraser.	September, 1936, p. 875.	1
		Report (Netherlands and Colonies, Germany, Belgium and Colony, Luxemburg, Denmark, Norway, Sweden, Finland, Poland, Austria, Hungary, Switzerland), by Th. W. Mundt.	March, 1937, p. 775.	24
		Report (Bulgaria, Egypt, Spain, France and Colonies, Greece, Italy, Portugal and Colonies, Rumania, Czechoslovakia, Turkey and Jugoslavia), by V. Degreef.	May, 1937, p. 1245.	34

NUMBER of the question.	TITLE OF THE QUESTION	DOCUMENTS	YEAR, MONTH AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.

2nd Section : Locomotives and rolling stock.

IV	Evolution of the rail motor car as regards its construction, and special investigation into the transmission and brake questions. Comparative methods of testing railcars. Detailed investigation into the costs of railcars and the methods of reducing them.	*Report* (North and South America, China, and Japan), by E. WANAMAKER.	April, 1937, p. 857.	26
		Report (Germany, Poland, Denmark, Norway, Sweden, Finland, Austria, Hungary, Switzerland, Czechoslovakia, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt), by Herr STROEBE.	May, 1937, p. 1281.	35
		Report (France and Colonies, Belgium and Colony, Luxemburg, Netherlands and Colonies, Great Britain, Dominions and Colonies, Spain, Portugal and Colonies, Italy), by L. DUMAS and J. LEVY.	May, 1937 p. 1363.	36
V	Recent improvements in steam locomotives of the usual type and tests of new designs (high-pressure reciprocating locomotives and turbine locomotives) as regards construction, quality of materials used, efficiency, working conditions, maintenance and financial results. Testing locomotives at locomotive experimental stations, and in service with dynamometer cars and brake locomotives.	*Report* (Great Britain, Dominions and Colonies, America, China and Japan), by Sir H. NIGEL GRESLEY.	December, 1936, p. 1291.	9
		Report (Germany, Austria, Belgium and Colony, Denmark, Finland, France and Colonies, Hungary, Luxemburg, Norway, Netherlands and Colonies, Poland, Sweden and Switzerland), by Messrs. A. PARMANTIER and R. DUGAS.	April, 1937, p. 895.	27
		Report (Italy, Spain, Portugal and Colonies, Czechoslovakia, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt), by A. MASCINI.	April, 1937, p. 1041.	28
VI	Methods and devices used, in connection with electric traction, to save current between the supply side of the power station and the driving wheels (feeders, substations, tractors), and in particular the use of mercury rectifiers.	*Report* (Great Britain, Dominions and Colonies, India, North and South America, China, Japan), by C. E. FAIRBURN.	January, 1937, p. 73.	14
		Report (Switzerland, France and Colonies, Spain, Portugal and Colonies, Italy , Belgium and Colony, Luxemburg, Netherlands and Colonies, Egypt), by Messrs. EGGENBERGER and ECKERT.	March, 1937, p. 641.	21
		Report (Austria, Germany, Denmark, Norway, Sweden, Finland, Poland, Hungary, Czechoslovakia, Jugoslavia, Bulgaria, Rumania, Greece, Turkey), by E. R. KAAN.	March, 1937, p. 705.	22

3rd Section : Working.

VII	Economical operation of the main line system's secondary lines. Various methods adopted to adjust the operating facilities, safety measures, and station organisation to the volume of traffic.	*Report* (France and Colonies, Belgium and Colony, Luxemburg, America, China and Japan), by Messrs. GRANDJEAN and GILMAIRE.	October, 1936, p. 999.	2
		Report (Italy, Spain, Portugal and Colonies, Switzerland, Austria, Hungary, Czechoslovakia, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt), by G. C. PALMIERI.	November, 1936, p. 1129.	5
		Report (Germany, Great Britain, Dominions and Colonies, Denmark, Finland, Norway, Netherlands and Colonies, Poland and Sweden), by T. EMERS.	November, 1936, p. 1183.	6

NUMBER of the question.	TITLE OF THE QUESTION	DOCUMENTS	YEAR, MONTH AND PAGE of the English *Bulletin.*	NUMBER of the separate issue.
VIII	Application of rational organisation (planning) to the transport of goods, especially in connection with: (1) the functions and internal working of shunting yards; (2) the provision of inter-yard connections; (3) the estimation of the probable traffic to be dealt with, and the provision of the trains required; (4) the information to be given to the consignees; (5) the acceleration of the turn-round of empty stock; (6) the use of containers and rail-road wagons.	*Report* (Belgium and Colony, Luxemburg, Netherlands and Colonies, France and Colonies, Spain, Portugal and Colonies, Italy, Egypt), by J. COLLE.	October, 1936, p. 1027.	3
		Report (Great Britain, Dominions and Colonies, North and South America, China and Japan), by V. M. BARRINGTON-WARD.	November, 1936, p. 1113.	4
		Report (Germany, Austria, Bulgaria, Denmark, Finland, Greece, Hungary, Norway, Poland, Rumania, Sweden, Czechoslovakia, Turkey and Jugoslavia), by Dr.-Ing. A. BAUMANN.	May, 1937, p. 1191.	31
IX	Results obtained from the automatic and distant operation of signals and points, and from locomotive cab signals.	*Report* (France and Colonies, Great Britain, Dominions and Colonies, Belgium and Colony, Luxemburg, America, China and Japan), by J. TUJA and A. LEMONNIER.	January, 1937, p. 137.	15
		Report (Italy, Switzerland, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt, Spain, Portugal and Colonies), by Carlo BELLOMI and Gino MINUCCIANI.	April, 1937, p. 789.	25
		Report (Austria, Czechoslovakia, Denmark, Finland, Germany, Hungary, Netherlands and Colonies, Norway, Poland, Sweden), by A. MISZKE.	April, 1937, p. 1089.	29

4th Section : General.

NUMBER of the question.	TITLE OF THE QUESTION	DOCUMENTS	YEAR, MONTH AND PAGE of the English *Bulletin.*	NUMBER of the separate issue.
X	Effects of the world crisis and road competition on the railway position. Corresponding changes in railway commercial policy.	*Report* (Four main-line Railways of Great Britain — affiliated to the International Railway Union [U. I .C.] — and main-line Railways of all other countries, not affiliated to the International Railway Union), by Mr. ASHTON DAVIES.	February, 1937, p. 309	17
		Report (All main-line Railways affiliated to the International Railway Union [U. I. C.], except the four British main-line Railways), by Dr. COTTIER and Dr. TRIERENBERG.	April, 1937, p. 1109.	3
		Report (All secondary Railways), by Messrs. LA VALLE and MELLINI.	May, 1937, p. 1209.	32
XI	Selection, orientation, and instruction of railway staff.	*Report* (Italy, Spain, Portugal and Colonies, Great Britain, Dominions and Colonies, America, China, Japan, Egypt), by Pietro LO BALBO.	December, 1936, p. 1549.	1
		Report (Poland, Germany, Netherlands and Colonies, Denmark, Norway, Sweden, Finland), by J. WOJCIECHOWSKI.	December, 1936, p. 1559.	1
		Report (Czechoslovakia, France and Colonies, Belgium and Colony, Luxemburg, Switzerland, Austria, Hungary, Jugoslavia, Bulgaria, Rumania, Greece, Turkey), by J. HONDL.	February, 1937, p. 443.	1

NUMBER of the uestion.	TITLE OF THE QUESTION	DOCUMENTS	YEAR, MONTH AND PAGE of the English *Bulletin.*	NUMBER of the separate issue.
	5th Section : Light railways and colonial railways.			
XII	Co-ordination of operation as between main-line and light railways.	*Report* (All countries), by Messrs. BELMONTE and TOSTI.	May, 1937, p. 1225.	33
XIII	Specifications for the fixed plant of railways with light traffic, intended to prevent the use of unnecessarily expensive track equipment, and generally to give economical working.	*Report* (Great Britain, Dominions, and Colonies, America, China, Japan), by Mr. VAN NOORBEECK.	November, 1936, p. 759.	7
		Report (Countries of Continental Europe and their Colonies, Egypt), by A. SVOBODA.	March, 1937, p. 759.	23

PROGRAMME OF EVENTS.

Monday, May 31st :

11.0 a.m. — Meeting of the Permanent Commission.

12.0, noon. — Reception of the Delegates by the Permanent Commission.

Tuesday, June 1st :

10.45 a.m. — Opening Ceremony of the Session, under the presidency of the President of the French Republic.

Afternoon. — Visits (*) *(a)*, *(b)* and *(c)*.

Wednesday, June 2nd :

9.0 a.m. — Separate sectional Meetings, each under the provisional presidency of a Member of the Permanent Commission, for the appointment of the Sectional Officers.

9.30 a.m. — Sectional Meetings.
Motor trip through Paris, arranged for the families of Delegates.

4.0 p.m. — Reception of the Members at the Paris Town Hall by the Municipality.

Evening. — Entertainment at the Opera House.

Thursday, June 3rd :

9.30 a.m. — Sectional Meetings.
Motor trip through Paris, arranged for t
families of Delegates.

Afternoon. — Visits *(a)*, *(b)*, *(c)* and *(d*
Excursion : The Chevreuse-Dampierre Va
ley.

Friday, June 4th :

9.30 a.m. — Sectional Meetings.
Motor trip through Paris, arranged for t
families of Delegates.

Afternoon. — Visits *(e)*, *(g)* and *(h)*.
Excursion : Sceaux Park. Sports meeti
at the Croix de Berny.

Saturday, June 5th :

9.50 a.m. — Motor trip through Paris, a
ranged for the families of Delegates.

Afternoon. — Excursions :
Saint-Germain and Versailles;
Fontainebleau;
Castles of the Loire;
Compiègne Forest. Castles of Pierrefonds a
Compiègne.

Sunday, June 6th :

Afternoon. — Excursion : Horse races
Chantilly. — Prix de Diane.

Monday, June 7th :

9.30 a.m. — Plenary Meeting.
Motor trip through Paris, arranged for
families of Delegates.

Evening. — Dinner given by the Fren
Railways.

Tuesday, June 8th :

9.30 a.m. — Sectional Meetings.
Motor trip through Paris, arranged for
families of Delegates.

(*) Object of visits *(a)* to *(h)* :

(a) The Locomotive Testing Station at Vitry-sur-Seine. The Arrighi Power Station of the Union d'Electricité. The Chevilly 220 000-volt substation.
(b) Printing Works of the *Illustration*, at Bobigny. Shunting yard at Le Bourget.
(c) The Gare de l'Est. Marshalling yard at Vaires.
(d) Saint-Lazare Station (centralised traffic control).
(e) Psychotechnical laboratory of the Société des Transports en Commun de la Région Parisienne (S.T.C.R.P.).
(f) Rolling stock maintenance yard at Landy, and locomotive depot at La Chapelle.
(g) Permanent-way workshops at Moulin-Neuf.
(h) New station at Versailles-Chantiers.

Further particulars about these visits are given on pp. 1973 to 1975 of this *Bulletin*.

Excursions :
Visit of the liner « Normandie » at Havre;
The Castles of the Loire.

Afternoon. — Visits *(c)*, *(d)*, *(e)* and *(f)*.

Wednesday, June 9th :

9.30 a.m. — Sectional Meetings.
Motor trip through Paris, arranged for the families of Delegates.

5.0 p. m. — Garden Party at the Elysée Palace. (Reception given by the President of the French Republic in honour of the Members.)

Evening. — Entertainment at the Opera House.

Thursday, June 10th :

9.30 a.m. — Sectional Meetings.

Motor trip through Paris, arranged for the families of Delegates.

Afternoon. — Visits *(a)*, *(b)*, *(c)*, *(g)* and *(h)*.

Excursions :
The Chevreuse-Dampierre Valley;
The Castles of the Loire.

Friday, June 11th :

9.30 a.m. — Plenary Meeting.

11.0 a.m. — Closing Ceremony of the Session, under the presidency of M. le Baron E. DE ROTHSCHILD.

Evening. — Departure for 3-day excursion No. 1 (Côte d'Argent and Pyrenees), and 4-day excursion No. 2 (Route des Alpes).

Saturday, June 12th :

Afternoon. — Excursions :
Saint-Germain and Versailles.
Fontainebleau;
Compiègne Forest. Pierrefonds and Compiègne Castles.

Departure for 3-day excursion No. 3 (Vosges and Alsace), 3 1/2-day excursion No. 4 (Britanny) and 3 1/2-day excursion No. 5 (Auvergne and Pyrenees).

Sunday, June 13th :

Evening. — Departure for 3-day excursion No. 6 (Provence).

Note. — Particulars about the excursions are given on pp. 1975 to 1979 of this *Bulletin.*

List of the participating Administrations and affiliated Organisations.

(Position at 15th May, 1937).

ADMINISTRATIONS.	Km.	*Miles.*
ALLEMAGNE (GERMANY).		
Deutsche Reichsbahn	54 365	33 781
ARGENTINE.		
Chemins de fer de l'Etat	9 134	5 676
Buenos Ayres Great Southern Railway	8 164	5 073
Buenos Ayres and Pacific Railway	4 515	2 806
Buenos Ayres Western Railway	3 108	1 931
Central Argentine Railway	5 953	3 699
Entre Rios Railways	1 303	810
Chemins de fer de Rosario à Puerto Belgrano	826	513
Chemins de fer de la province de Santa-Fé	2 055	1 277
AUTRICHE (AUSTRIA).		
Chemins de fer fédéraux autrichiens	5 797	3 602
BELGIQUE (BELGIUM).		
Société Nationale des Chemins de fer belges	4 851	3 014
Chemin de fer de Chimay	61	38
Chemin de fer de Malines à Terneuzen	79	49
Chemin de fer du Nord français (lignes Nord belges)	170	106
Société Nationale des Chemins de fer vicinaux	4 689	2 914
Compagnie d'entreprises électriques et industrielles « Electrobel »	38	24
Railways économiques de Liége-Seraing et extensions	21	13
Compagnie belge de chemins de fer et d'entreprises	188	117
Colony.		
Chemins de fer du Bas-Congo au Katanga	2 506	1 557
Chemins de fer du Congo Supérieur aux Grands Lacs africains	763	474
Chemins de fer Vicinaux du Congo.	715	444

ADMINISTRATIONS.	Km.	
Office d'Exploitation des Transports coloniaux	506	
BRESIL (BRAZIL).		
Compagnie des chemins de fer de l'Est brésilien	2 293	
Great Western of Brazil Railway	1 713	
Chemins de fer de Rio Grande do Sul	2 610	
BULGARIE (BULGARIA).		
Chemins de fer de l'Etat	2 843	
CHILI (CHILE).		
Nitrate Railways	645	
Taltal Railway	264	
CHINE (CHINA).		
Chemin de fer du Lunghai	1 051	
Chemin de fer de Pékin-Hankow	1 213	
Compagnie générale de chemins de fer et de tramways en Chine	621	
South Manchuria Railway	1 125	
COLOMBIE (COLUMBIA).		
Société Nationale de chemins de fer en Colombie	252	
DANEMARK (DENMARK)		
Chemins de fer de l'Etat	2 591	
Chemin de fer privé d'Aalborg	259	
Chemin de fer de l'Est de Seeland	47	
Chemins de fer de la Fionie méridionale	216	
Chemin de fer de Lolland-Falster	104	
EGYPTE (EGYPT).		
Chemins de fer de l'Etat	3 270	
ESPAGNE (SPAIN).		
Chemins de fer Andalous	1 644	
Chemins de fer économiques des Asturies	115	
Ferrocaril Cantabrico	105	

ADMINISTRATIONS.	Km.	*Miles.*
emins de fer Catalans (réseaux e la C^{ie} du Chemin de fer Cenral Catalan, du Chemin de fer lu Nord-Est de l'Espagne et du ramway ou chemin de fer écoomique de Manrésa à Berga) . .	201	125
emin de fer Central de Aragon .	420	261
plotación de Ferrocarriles por el stado	351	218
emins de fer de Madrid à Saraosse et à Alicante	3 670	2 280
emins de fer du Nord de l'Esagne	3 801	2 362
npagnie Nationale des chemins e fer de l'Ouest de l'Espagne . .	1 587	986
eat Southern of Spain Railway .	168	104
nes et chemin de fer de Utrillas .	127	79
ETATS-UNIS D'AMERIQUE NITED STATES OF AMERICA).		
timore and Ohio Railroad . . .	8 791	5 463
ssemer and Lake Erie Railroad .	364	226
aware and Hudson Company . .	1 195	743
e Railroad	3 585	2 166
ng Island Railroad	634	394
nsylvania Railroad System . .	16 806	10 443
ding Company	2 295	1 426
FINLANDE (FINLAND).		
mins de fer de l'Etat	5 363	3 332
ANCE, ALGERIE ET TUNISIE, OLONIES ET PROTECTORATS RANCE, ALGERIA AND TUISIA, COLONIES AND PROECTORATES).		
(a) *France.*		
mins de fer de l'Etat	9 665	6 006
mins de fer d'Alsace et de Lorine	2 090	1 299
mins de fer de l'Est	5 1 2	3 189
min de fer Métropolitain de ris	144	89
mins de fer du Midi	4 310	2 678
nin de fer du Nord	3 922	2 437
nin de fer de Paris à Orléans .	7 408	4 603
nins de fer de Paris à Lyon et a Méditerranée	9 948	6 182
nins de fer du Cambrésis . . .	120	75

ADMINISTRATIONS.	Km.	*Miles.*
Chemins de fer Départementaux .	1 947	1 210
Société générale des Chemins de fer Economiques	3 730	2 318
Chemins de fer Economiques du Nord	181	112
Voies ferrées des Landes	343	213
Chemins de fer Secondaires du Nord-Est	646	401
Chemin de fer de Somain à Anzin et à la frontière belge	37	23
Compagnie générale des chemins de fer Vicinaux	693	431
Compagnie générale de Voies ferrées d'intérêt local	430	267
Régie départementale des Tramways de l'Ain	436	271
Tramways départementaux des Deux-Sèvres	198	123
Tramways de l'Indre	182	113
(b) *Algeria and Tunisia.*		
Chemins de fer algériens de l'Etat .	3 647	2 266
Chemins de fer algériens de la Compagnie de Paris à Lyon et à la Méditerranée	1 235	767
Chemin de fer de Gafsa	453	281
Compagnie fermière des chemins de fer tunisiens	1 610	1 001
(c) *Colonies and Protectorates.*		
Africa.		
Chemins de fer de l'Afrique équatoriale française et du Cameroun .	1 014	630
Chemins de fer de l'Afrique occidentale française et Togo	4 169	2 591
Chemin de fer franco-éthiopien de Djibouti à Addis-Abeba	783	487
Chemins de fer de Madagascar . .	759	472
Compagnie des Chemins de fer du Maroc	952	592
Chemins de fer de la Réunion . .	127	79
Asia.		
Chemin de fer de Damas-Hama et prolongements	583	362
Chemins de fer coloniaux de l'Indochine	2 577	1 601
Compagnie française des chemins de fer de l'Indochine et du Yunnan .	860	535

ADMINISTRATIONS.	Km.	*Miles.*
GRANDE-BRETAGNE ET NORD DE L'IRLANDE, INDES, DOMINIONS, PROTECTORATS ET COLONIES (GREAT BRITAIN AND NORTHERN IRELAND, INDIA, DOMINIONS, PROTECTORATES AND COLONIES).		
(a) *Great Britain and Northern Ireland.*		
Great Western Railway	5 925	3 682
London Midland and Scottish Railway	11 159	6 934
London and North Eastern Railway.	10 411	6 469
London Passenger Transport Board.	284	176
Southern Railway	3 469	2 156
Cheshire Lines Committee	230	143
Great Northern Railway (¹) . . .	896	557
Isle of Man Railway	74	46
County Donegal Railways Joint Committee (¹)	201	125
Great Central and Midland Joint Committee	63	39
Midland and Great Northern Railways Joint Committee	295	183
(b) *India Dominions, Protectorates and Colonies.*		
Africa.		
Kenya and Uganda Railways . . .	2 611	1 622
Mashonaland Railway	1 485	923
Nigerian Railway	3 065	1 905
South African Railways and Harbours	21 203	13 175
Sudan Railways	3 258	2 024
Asia.		
Ceylon.		
Ceylon Government Railway . . .	1 531	951
India.		
Bengal Nagpur Railway	5 179	3 218
Bengal and North Western Railway.	3 387	2 105
Bombay, Baroda and Central India Railway	5 940	3 691
Burma Railways	3 315	2 060

ADMINISTRATIONS.	Km.	*Mi*
Eastern Bengal Railway (State Railway of India)	3 231	2
East Indian Railway (State Railway of India)	7 068	4
Great Indian Peninsula Railway (State Railway of India)	5 998	3
Madras and Southern Mahratta Railway	5 200	3
North Western Railway (State Railway of India)	11 183	6
Rohilkund and Kumaon Railway . .	920	
South Indian Railway	4 064	2
Mesopotamia.		
Iraq Railways	1 218	
Australasia.		
New South Wales Government Railways	9 924	6
New Zealand Government Railways.	5 257	3
GRECE (GREECE).		
Chemins de fer de l'Etat	1 320	
Chemins de fer du Nord-Ouest de Grèce	68	
Chemins de fer Pirée-Athènes-Péloponèse	815	
Chemins de fer de Thessalie . . .	233	
HONGRIE (HUNGARY)		
Chemins de fer Royaux de l'Etat	7 795	4
IRISH FREE STATE.		
County Donegal Railways Joint Committee (²)	201	
Great Northern Railway (²) . . .	896	
Great Southern Railways	3 440	2
ITALIE (ITALY).		
Chemins de fer de l'Etat	17 007	10
Chemins de fer de la Méditerranée .	737	
Chemins de fer du Nord de Milan .	248	

(¹) Also shewn under Irish Free State.

(²) Also shewn under Great Britain and Northern Ireland.

ADMINISTRATIONS.	Km.	Miles.
Société Vénitienne pour la construction et l'exploitation de chemins de fer secondaires en Italie . . .	553	344
Chemin de fer de Reggio-Emilia . .	71	44
Chemins de fer complémentaires de la Sardaigne	697	433
Chemin de fer de Suzzara-Ferrara .	82	51
Ferrovie del Sud-Est	475	295
Ferrovie Torino-Nord	59	37
Société Nationale de chemins de fer et de tramways	205	127
Tramways piémontais	117	73
Società Trazione e Ferrovie Elettriche Toscane	41	26
Société sicilienne de travaux publics (Chemin de fer Circumetnea)	120	75
Società Trazione Elettrica Lombarda	105	65
Société turinoise de tramways et de chemins de fer économiques . .	65	40
Tramways Vercellesi	112	70
Tramways électriques de Brescia .	193	120
JAPON (JAPAN).		
Government Railways	14 570	9 054
Government General of Chosen, Railway Bureau	3 229	2 006
LUXEMBOURG (LUXEMBURG).		
hemins de fer Guillaume-Luxembourg	207	129
hemins de fer et Minières Prince Henri	193	120
MEXIQUE (MEXICO).		
Mexican Railway Company Ltd. . .	700	435
NORVEGE (NORWAY).		
hemins de fer de l'Etat	3 584	2 207
PAYS-BAS ET COLONIES (NETHERLANDS and COLONIES).		
(a) *Netherlands.*		
hemins de fer néerlandais (Compagnie pour l'exploitation des chemins de fer de l'Etat néerlandais + Chemins de fer hollandais)	3 409	2 118
ramway à vapeur de Breskens à Maldegem	69	43
(b) *Colonies.*		
Chemins de fer de l'Etat aux Indes néerlandaises	4 350	2 703
Société des Chemins de fer aux Indes néerlandaises	855	531
Tramway à vapeur Semarang-Cheribon	388	241
POLOGNE (POLAND).		
Chemins de fer de l'Etat	17 500	10 874
PORTUGAL AND COLONIES		
(a) *Portugal.*		
Chemins de fer portugais de la Beira-Alta	253	157
Compagnie des chemins de fer portugais	2 469	1 534
Compagnie nationale des chemins de fer portugais	356	221
Companhia Portuguesa para a construção e exploração de caminhos de ferro, Linhas do Vale do Vouga	178	111
(b) *Colonies.*		
Chemins de fer de l'Etat	1 049	652
Port et chemins de fer du Mozambique	430	267
Chemins de fer du Benguela . . .	1 347	837
ROUMANIE (RUMANIA).		
Chemins de fer de l'Etat	11 129	6 915
SALVADOR.		
Salvador Railway	161	100
SUEDE (SWEDEN).		
Chemins de fer de l'Etat	7 446	4 627
Chemins de fer Bergslagen . . .	552	343
Chemin de fer Blekinge Kustbanor .	203	126
Chemin de fer Boras-Herrljunga .	127	79
Chemin de fer Gefle-Dala	293	182
Chemin de fer Göteborg-Borås et Borås Alfvesta	261	162

ADMINISTRATIONS.	Km.	*Miles.*
Chemin de fer Halmstad-Nässjö . .	411	255
Chemin de fer Helsingborg-Hessleholms	122	76
Chemin de fer Kalmar-Nya . . .	195	121
Chemin de fer Karlskrona-Växjö .	114	71
Chemin de fer Nässjö-Oskarshamn .	148	92
Chemin de fer Nora-Bergslagen . .	173	107
Chemin de fer Nordmarks-Klarelfvens	171	106
Chemin de fer Norra-Oestergötland.	134	83
Chemin de fer Norsholm-Westervik-Hultsfred	245	152
Chemin de fer Oxelösund-Flen-Västmanlands	300	186
Chemin de fer Stockholm-Roslag .	238	148
Chemin de fer Stockholm-Vesteras-Bergslagen	479	298
Chemin de fer Västergötland-Göteborg	380	236
SUISSE (SWITZERLAND).		
Chemins de fer fédéraux	2 932	1 822
Chemins de fer des Alpes bernoises (Berne-Loetschberg-Simplon) . .	253	157
Chemin de fer Rhétique	276	172

ADMINISTRATIONS.	Km.	*Mile*
Chemin de fer de Viège à Zermatt .	44	
Chemin de fer d'Yverdon à Ste-Croix	25	
Chemin de fer de Lausanne à Ouchy	2	1
TCHECOSLOVAQUIE (CZECHOSLOVAKIA).		
Chemins de fer de l'Etat	12 429	7 7
TURQUIE (TURKEY).		
Chemins de fer de l'Etat turc . . .	5 674	4 1
URUGUAY.		
Central Uruguay Railway of Montevideo	1 577	9
YOUGOSLAVIE (JUGOSLAVIA).		
Chemins de fer de l'Etat	9 344	5 8

Affiliated Organisations.

Association of American Railroads.

Compagnie auxiliaire internationale de chemins de fer.

Compagnie internationale des wagons-lits et des grands express européens.

Federazione Nazionale Fascista degli Esercenti Imprese Ferroviarie, Tramviarie e di Navigazione interna.

Railway Clearing House (Great Britain).

Union internationale des chemins de fer (U. I. C.).

Union of Swedish Private Railways (Svenska Järnvägsföreningen).

Union des voies ferrées et des transports automobiles.

Comité Permanent des Transports par voie ferrée de la Société des Nations.

Premier Groupement Régional des Chemins de fer Européens membres de l'U. I. C. (Grem).

Mitteleuropäische Schlafwagen- und Speisewagen A. G. (Mitropa).

GENERAL LIST OF DELEGATES.

Note. — An asterisk (*) means that a delegate is already a member of the Congress in some other pacity, this latter being inserted in brackets.

◆ = Present in Paris.

I. — Delegates of the Permanent Commission.

A. — PERMANENT COMMISSION.

President :

. **Rulot**, directeur général de la Société Nationale Chemins de fer belges (Belgium).

Vice-presidents :

Lamalle, directeur général adjoint, directeur de ploitation de la Société Nationale des Chemins de belges (Belgium);

Besnerais, directeur de l'Exploitation de la Comnie du Chemin de fer du Nord français (France).

Members of the Executive Committee :

rimpret, conseiller d'Etat, secrétaire général du istère des Travaux publics de France, chargé de Direction des chemins de fer;

ne Right Hon. Lord **Rockley**, P. C., G. B. E., direc- Southern Railway (Great Britain);

Vickers, director, London Midland & Scottish way (Great Britain).

Ex-President of Session, ex-officio member :

E. Ibrahim Fahmy **Kerim** Pasha (Egypt).

Members :

e Hon. E. C. G. **Cadogan**, C. B., M. P., director, t Western Railway (Great Britain);

Castiau, secrétaire général du Ministère des sports (Belgium);

E. **Mahmoud Chaker** Pasha, Under Secretary of , General Manager of the Egyptian State Rail- ;

W. **Clement**, president, Pennsylvania Railroad S. A.);

da Costa Couvreur, ingénieur, inspecteur, secré- général au Ministère des Travaux publics et Communications (Portugal);

utry, directeur général des Chemins de fer de (France);

Francis Dent, C. V. O., director, Southern Rail- (Great Britain);

Ruffi de Pontevès, inspecteur général des mines, teur du contrôle du travail des agents de che- de fer, Ministère des Travaux publics (France);

Othon **de Senn**, secrétaire d'Etat, président de irection des Chemins de fer royaux de l'Etat gary);

Spirlet, inspecteur général des lignes Nord s (Belgium);

◆ Dr. Ing. eh. J. **Dorpmüller**, Minister of Communications, and General Manager of the German State Railways;

◆ F. **Fiori**, ingénieur, administrateur des Chemins de fer de l'Etat (Italy);

Sir Henry **Fowler**, K. B. E., Chairman of Committee, Ministry of Transport (Great Britain);

◆ P. **Ghilain**, ingénieur en chef au Service du Matériel de la Société Nationale des Chemins de fer belges (Belgium);

◆ A. **Granholm**, directeur général des Chemins de fer de l'Etat (Sweden);

◆ Sir H. Nigel **Gresley**, C. B. E., D. Sc., chief mechanical engineer, London & North Eastern Railway;

◆ Ch. **Gufflet**, directeur général honoraire de la Compagnie des Chemins de fer du Midi (France);

◆ R. J. **Harvey**, consulting engineer to the Government of New Zealand;

◆ A. **Henry-Gréard**, directeur de la Compagnie du Chemin de fer de Paris à Orléans (France);

◆ Sir Cyril **Hurcomb**, K. B. E., C. B., secretary to the Ministry of Transport (Great Britain);

◆ Masuru **Iwamura**, secretary of the Japanese Ministry of Railways, manager of the Berlin Office;

◆ L. **Jacobs**, directeur général de la Société Nationale belge des Chemins de fer Vicinaux (Belgium);

G. **Jadot**, directeur du Service des Finances de la Société Nationale des Chemins de fer belges (Belgium);

◆ H. **Jezierski**, conseiller ministériel au Ministère des Communications (Poland);

E. **Kejr**, ingénieur, conseiller ministériel, chef du département V/5 au Ministère des chemins de fer (Czechoslovakia);

◆ L. H. **Kirkness**, secretary to the Railway Board of India;

◆ Dr. Th. **Kittel**, Reichsbahndirektor, German State Railways;

◆ P. **Knutzen**, directeur général des Chemins de fer de l'Etat (Denmark);

◆ **Kradolfer**, directeur de l'Office fédéral des transports (Switzerland);

◆ C. **Lemaire**, directeur du service de la voie de la Société Nationale des Chemins de fer belges (Belgium);

L. F. **Loree**, president, Delaware & Hudson Railroad (U. S. A.);

Ion **Macovei**, ingénieur, inspecteur général, directeur général des Chemins de fer de l'Etat (Rumania);

◆ A. **Mange**, administrateur de la Compagnie du Chemin de fer de Paris à Orléans, président du Comité de gérance de l'Union internationale des Chemins de fer;

◆ A. **Marguerat**, directeur des Compagnies de chemins de fer de Viège à Zermatt, Furka-Oberalp, Gornergrat et Schöllenen (Switzerland);

E. **Maristany**, marquis d'Argentera, directeur général de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain);

L. **Moralès**, vice-président du Conseil supérieur des chemins de fer d'Espagne, président du Conseil d'administration des chemins de fer de l'Ouest de l'Espagne (Spain);

J. **Moreno Ossorio**, administrateur à la Commission permanente du Comité exécutif des Chemins de fer du Nord de l'Espagne (Spain);

◆ E. **Mugniot**, directeur général de la Compagnie des Chemins de fer de Paris à Lyon et à la Méditerranée (France);

B. **Nobili**, ingénieur, vice-directeur général des Chemins de fer de l'Etat (Italy);

H. E. Mohamed **Osman** Bey, under secretary of State, Egyptian Ministry of Communications;

◆ G **Ottone**, president, Federazione Nazionale Fascista degli Esercenti Imprese Ferroviarie, Tramviarie e di Navigazione interna (Italy);

◆ **Pellarin**, directeur de la Compagnie des Chemins de fer de l'Est (France);

J. J. **Pelley**, president, Association of American Railroads (U. S. A.);

C. **Ramallo**, ingénieur, director del Instituto de Economia de los Transportes, Facultad Nacional de Ciencias Económicas (Argentina);

◆ Dr. W. **Rauscher**, conseiller ministériel, directeur commercial des Chemins de fer fédéraux (Austria);

◆ Dr. K. **Sauer**, Ministerialrat, German Ministry of Communications;

◆ A. **Schrafl**, président de la Direction générale des Chemins de fer fédéraux (Switzerland);

◆ G. **Sgoureff**, ingénieur, directeur général adjoint des Chemins de fer et des Ports de l'Etat (Bulgaria);

Sir Josiah **Stamp**, G. B. E., D. Sc., chairman and president of the Executive, London Midland & Scottish Railway (Great Britain);

◆ **Surleau**, directeur des Chemins de fer d'Alsace et de Lorraine (France);

◆ T. C. **Swallow**, advisory engineer, Office of the High Commissioner for the Union of South Africa;

R. E. **Thomas**, deputy general manager, Egyptian State Railways;

Antonio **Valenciano y Mazerès**, inspecteur général des Ponts et Chaussées, administrateur de la Compagnie des Chemins de fer de Madrid à Saragosse et à Alicante (Spain);

◆ H. **van Manen**, directeur des Chemins de fer néerlandais (Netherlands);

◆ Th. M. B. **van Marle**, inspecteur-generaal van het Verkeer, Rijksverkiersinspect'e (Netherlands);

◆ L. **Velani**, directeur général des Chemins de fer de l'Etat (Italy);

A. M. M. **Verkoyen**, directeur du Service du Matériel de la Société Nationale des Chemins de fer belges (Belgium);

◆ Dr. C. C. **Wang**, representative of the Chinese Ministry of Railways;

◆ Sir Ralph Lewis **Wedgwood**, C. B., C. M. G., chief general manager, London & North Eastern Railway (Great Britain);

D. **Willard**, chairman of the Board, Association of American Railroads; president, Baltimore & Ohio Railroad;

◆ M. **Yeyitch**, directeur général adjoint des Chemins de fer de l'Etat (Jugoslavia).

Honorary Member :

C. **Colson**, membre de l'Institut, inspecteur gén des Ponts et Chaussées, vice-président honoraire Conseil d'Etat de France, membre du Conseil su rieur des chemins de fer (France).

General secretary :

◆ P. **Ghilain** (*).

Assistant secretaries :

◆ A. W. **Chantrell**, ingénieur principal au Service Matériel de la Société Nationale des Chemins de belges;

◆ J. **Dubus**, ingénieur au Service de la voie de Société Nationale des Chemins de fer belges;

E. **Minsart**, ingénieur principal au Service du tériel de la Société Nationale des Chemins de belges.

Chief of the Secretariat :

◆ V. **Teugels**, Chef de division à la Société Natio des Chemins de fer belges.

B. — FRENCH LOCAL ORGANISING COMMISSION.

President :

◆ M. **Bedouce**, Minister of Public Works.

Members :

◆ **Riboulet**, président de la Section des Travaux blics au Conseil d'Etat;

◆ **Charlot**, président du Conseil Supérieur des mins de fer;

Mollard, président de la Commission des Trav Publics au Sénat;

◆ **Lafaye**, président de la Commission des Trav Publics de la Chambre des Députés;

◆ Marcel **Régnier**, rapporteur du Budget au Sénat

◆ **Pomaret**, rapporteur du Budget des Chemins de de la Chambre des Députés;

◆ **Grimpret** (*), conseiller d'Etat, secrétaire généra Ministère des Travaux Publics, chargé de la Di tion Générale des Chemins de fer (member of Permanent Commission of the Association);

◆ **Gerdès**, inspecteur général des Ponts et Chaus directeur du Contrôle de la voie et des bâtimen des lignes nouvelles au Ministère des Travaux blics;

◆ **de Ruffi de Pontevès** (*), inspecteur général Mines, directeur du Contrôle du travail des agen chemins de fer au Ministère des Travaux pu (member of the Permanent Commission of the ciation);

◆ **Gilles-Cardin**, inspecteur général des Pont Chaussées, directeur du Contrôle de l'Exploit commerciale des Chemins de fer au Ministère Travaux publics;

◆ **Baticle**, ingénieur en chef des Ponts et Chaus directeur du Contrôle de l'Exploitation techniq du Matériel et de la Traction au Ministère des vaux publics;

rasson, président de la Chambre de Commerce
'aris;

hwob, directeur général honoraire des Chemins
r. — Representative of the 1937 Exhibition;

issard, chef du Service des Congrès à l'Exposi-
— Representative of the 1937 Exhibition;

lmels, président du Conseil général de la Seine;

ymond **Laurent**, président du Conseil Municipal
'aris;

uer, président du Conseil de réseau des Chemins
r d'Alsace et de Lorraine;

uis **Marlio**, président du Conseil d'Administration
Compagnie des Chemins de fer de l'Est;

lvain **Dreyfus**, président du Conseil de Réseau
Chemins de fer de l'Etat;

ard, président du Conseil d'Administration de la
pagnie des Chemins de fer du Midi;

ron Edouard **de Rothschild**, président du Con-
l'Administration de la Compagnie du Chemin de
u Nord;

hemond, président du Conseil d'Administration
Compagnie du Chemin de fer de Paris à Orléans;

dré **Lebon**, président du Conseil d'Administra-
de la Compagnie des Chemins de fer de Paris à
et à la Méditerranée;

leau (*), directeur du réseau des Chemins de fer
ace et de Lorraine (member of the Permanent
nission of the Association);

larin (*), directeur de la Compagnie des Chemins
r de l'Est (member of the Permanent Commis-
of the Association);

utry (*), directeur général du réseau des Chemins
de l'Etat (member of the Permanent Commis-
of the Association);

lerc du Sablon, directeur de la Compagnie
hemins de fer du Midi;

Besnerais (*), directeur de l'Exploitation de la
agnie de Chemin de fer du Nord (member of
ermanent Commission of the Association);

ury-Gréard (*), directeur de la Compagnie du
in de fer de Paris à Orléans (member of the
nent Commission of the Association);

gniot (*), directeur général de la Compagnie des
ins de fer de Paris à Lyon et à la Méditerranée
ber of the Permanent Commission of the Asso-
);

hin, président du Comité des Chemins de fer de
n des Voies ferrées;

re **Jourdain**, président de l'Union technique des
ns de fer d'intérêt local et des Tramways
e);

re **Laroze**, président du Conseil d'Administra-
e la Compagnie du Chemin de fer Métropolitain
is;

iage, président du Conseil d'Administration de
iété des Transports en commun de la région
nne;

rgot-Noblemaire, directeur général de la Com-
Internationale des Wagons-Lits;

oud, directeur honoraire de la Compagnie des
ns de fer de l'Est;

and, ingénieur en chef à l'Office Central d'Etu-
Matériel de Chemins de fer;

atel, ingénieur en chef honoraire du Matériel
la Traction des Chemins de fer de l'Est;

di, directeur honoraire de l'Electrification de
pagnie des Chemins de fer de Paris à Orléans.

The ten **Members of the Executive Committee** named hereafter :

Executive Committee :

◆ **Vignau**, ingénieur en chef adjoint de l'Exploitation des Chemins de fer d'Alsace et de Lorraine;

◆ **Barth**, secrétaire général de la Direction du réseau de l'Est;

◆ **Porchez**, chef du Service de la Voie, des Bâtiments et de la Construction des Lignes nouvelles du réseau de l'Etat;

◆ **Cambournac**, ingénieur en chef des Travaux et de la Surveillance du réseau du Nord;

◆ **de Boysson**, directeur général adjoint du P. O.-Midi;

◆ **Martinet**, ingénieur en chef attaché à la Direction du réseau Paris-Lyon-Méditerranée;

◆ **Delille**, directeur de la Société Générale des Chemins de fer Economiques;

◆ Paul **Martin**, administrateur-délégué, directeur général du Chemin de fer Métropolitain de Paris;

◆ **Bacqueyrisse**, administrateur, directeur général de l'Exploitation et des Services techniques de la S. T. C. R. P.;

◆ **Bugniet**, directeur régional à Paris, de la Compagnie Internationale des Wagons-Lits.

Secretaries :

◆ **de Boysson**, directeur général adjoint du P. O.-Midi;

◆ **Barois**, ingénieur principal attaché au Service central du Matériel et de la Traction du P. O.-Midi;

◆ **du Plessis d'Argentré**, chef du Service des Œuvres Sociales du P. O.-Midi.

C. — REPORTERS ON THE QUESTIONS SUBMITTED TO THE CONGRESS.

◆ **Barrington-Ward**, superintendent, Western Section, London & North Eastern Railway (Great Britain);

◆ Dr. **Baumann**, Reichsbahndirektor, Deutsche Reichsbahn (Germany);

◆ **Bellomi**, inspecteur en chef supérieur à la Direction générale, service des travaux et des constructions, Chemins de fer de l'Etat (Italy);

◆ **Belmonte**, chef de service, Service commercial, Chemins de fer de l'Etat (Italy);

◆ **Colle**, ingénieur principal au service de l'exploitation, Société Nationale des Chemins de fer belges (Belgium);

◆ **Cottier**, directeur du 3e arrondissement des Chemins de fer fédéraux (Switzerland);

◆ Ashton **Davies**, chief commercial manager, London Midland & Scottish Railway (Great Britain);

◆ **De Greef**, ingénieur au service de la voie de la Société Nationale des Chemins de fer belges (Belgium);

◆ **Delille**, directeur de la Société générale des Chemins de fer Economiques (France) (member of the French Local Organizing Commission);

◆ **Dugas**, ingénieur en chef du service des machines des Chemins de fer P.-O.-Midi français;

◆ **Dumas**, ingénieur en chef adjoint du Matériel et de la Traction de la Compagnie du Chemin de fer du Nord (France);

Eckert, chef de section de la division de l'électrification des Chemins de fer fédéraux (Switzerland);

◆ **Eggenberger**, ingénieur en chef de la division de l'électrification des Chemins de fer fédéraux (Switzerland);

◆ **Ellson**, chief engineer, Southern Railway (Great Britain);

◆ **Emers**, inspecteur en chef supérieur du service de l'exploitation, Direction générale des Chemins de fer de l'Etat (Sweden);
◆ C. E. **Fairburn**, electrical engineer, London Midland & Scottish Railway (Great Britain);
◆ **Flament**, ingénieur en chef adjoint des travaux et de la surveillance, Compagnie du Chemin de fer du Nord (France);
◆ **Fraser**, engineer (Scotland), London & North Eastern Railway (Great Britain);
◆ **Gilmaire**, ingénieur principal du Service central de l'Exploitation de la Compagnie des Chemins de fer P. O.-Midi (France);
◆ **Grandjean**, ingénieur en chef de l'Exploitation des Chemins de fer d'Alsace et de Lorraine (France);
◆ Sir Nigel **Gresley** (*), C. B. E., D. Sc., chief mechanical engineer, London & North Eastern Railway (member of the Permanent Commission of the Association);
◆ Dr. Y. **Hashiguchi**, chief of the Railway Research Office, Japanese Government Railways;
◆ **Hondl**, directeur des services du personnel, Ministère des Chemins de fer (Czechoslovakia);
◆ **Kaan**, conseiller ministériel, directeur de l'électrification des Chemins de fer fédéraux (Austria);
La Valle, inspecteur en chef de vigilance, Inspectorat général des Chemins de fer, Tramways et Automobiles (Italy);
◆ **Lemaire** (*), directeur du Service de la Voie, à la Société Nationale des Chemins de fer belges (Belgium) (member of the Permanent Commission);
Lemonnier, chef de l'Exploitation, Chemins de fer de l'Etat (France);
◆ **Lévy**, chef du Service du Matériel et de la Traction des Chemins de fer de l'Etat (France);
◆ **Lo Balbo**, président du Conseil d'Administration de la Société anonyme de Tramways Dogliani-Monchiero (Italy);
◆ **Mascini**, inspecteur en chef supérieur, Service du Matériel et de la Traction, Chemins de fer de l'Etat (Italy);
◆ **Mellini**, inspecteur supérieur de vigilance, Inspectorat général des Chemins de fer, Tramways et Automobiles (Italy);
◆ **Minucciani**, inspecteur en chef, Service du Matériel et de la Traction, Chemins de fer de l'Etat (Italy);
◆ **Miszke**, ingénieur, professeur ordinaire de chemins de fer à l'Ecole polytechnique de Varsovie, membre du Conseil technique au Ministère des Communications (Poland);
◆ Dr.-Ing. **Müller**, Reichsbahndirektor, Deutsche Reichsbahn (Germany);
◆ **Mundt**, ingénieur en chef des Ponts du Service de la Voie des Chemins de fer néerlandais (Netherlands);
◆ **Palmieri**, ingénieur en chef supérieur, Service du Mouvement, Chemins de fer de l'Etat (Italy);
◆ **Parmantier**, ingénieur en chef du Matériel de la Compagnie des Chemins de fer P. L. M. (France);
◆ **Ridet**, ingénieur en chef adjoint de la Voie et des Travaux à la Compagnie des Chemins de fer de l'Est (France);
◆ **Stroebe**, Reichsbahndirektor, Deutsche Reichsbahn (Germany);
◆ **Svoboda**, ingénieur, conseiller technique au Ministère des Chemins de fer (Czechoslovakia);
◆ **Tosti**, chef de service, Service du personnel et des affaires générales, Chemins de fer de l'Etat (Italy);
◆ Dr. jur. **Trierenberg**, Reichsbahnoberrat, Deutsche Reichsbahn (Germany);
◆ **Tuja**, ingénieur en chef de l'exploitation, Che de fer de Paris à Lyon et à la Méditerranée (Fra
◆ **Van Noorbeeck**, directeur des Voies et Travaux Société Nationale des Chemins de fer Vicinaux (gium);
Wanamaker, electrical engineer, Chicago, Roc land & Pacific Railway (U. S. A.);
Wojciechowski, ingénieur, chef du Bureau psy technique au Ministère des Communications (Pol
◆ Dr. **Yamada**, director of the Bureau of Mainte and Improvement, Japanese Government Railwa

D. — PRINCIPAL SECRETARIES.

◆ A. **Allard**, directeur à la Société Nationale belg Chemins de fer Vicinaux (Belgium);
◆ A. W. **Chantrell** (*);
◆ J. **Dubus** (*);
◆ J. **Van Rijn**, ingénieur principal au Service Voie de la Société Nationale des Chemins d belges.

E. — SECTION SECRETARIES.

◆ Dr.-Ing. A. **Baumann** (*), Reichsbahndirektor, sche Reichsbahn (Reporter) (Germany);
◆ A. E. **Beresford**, London and North Eastern way (Great Britain);
◆ S. **Bourrel**, Société des Transports en Commu la Région parisienne (France);
◆ D. J. **Carling**, London and North Eastern Ra (Great Britain);
◆ **Chaperon**, chef des Services Administratifs Compagnie du Chemin de fer du Nord (France
◆ **Duchatel**, ingénieur adjoint du Contrôle des vaux extérieurs à la Compagnie des Chemins de Paris à Lyon et à la Méditerranée (France);
◆ **Emering**, inspecteur au Service du Matériel et Traction du réseau de l'Alsace et de Lo (France);
◆ K. **Günther**, Direktor bei der Reichsbahn, Deu Reichsbahn (Germany);
◆ B. **Harper**, London Midland & Scottish Ra (Great Britain);
◆ Dr. G. **Hein**, ministerialrat, Reichsverkehrs terium (Germany);
◆ **Mange**, inspecteur principal au Service de l'E tation de la Compagnie des Chemins de fer de à Lyon et à la Méditerranée (France);
◆ **Santini**, ingénieur, chef de la Division des Co tibles à la Compagnie des Chemins de fer de Lyon et à la Méditerranée (France);
◆ Dr. K. **Sauer**, Ministerialrat, Reichsverkehrs terium (Germany) (member of the Permanent mission of the Association):
◆ Dr. Ing. G. **Schramm**, Reichsbanhnrat, De Reichsbahn (Germany);
◆ **Schutz**, ingénieur principal aux Services T ques de l'Exploitation du réseau d'Alsace et d raine (France);
◆ **Walter**, chef de division adjoint au Service Voie des Chemins de fer de l'Etat (France);
◆ J. W. **Whiteside**, drawing office, Chief Mech Engineer's Department, London Midland and S Railway.

F. — GENERAL INTERPRETER.

◆ Dr. A. **Velleman**.

II. — Members appointed by adherent Governments and by affiliated Railway Administrations and Organisations.

— GOVERNMENTS AND THEIR DELEGATES.

Allemagne (Germany).

Reichsverkehrsministerium :

Dr. Ing. eh. J. **Dorpmüller** (*), Minister of Commu-
ations, and General Manager of the German State
lways (member of the Permanent Commission);
Dr. Ing. eh. M. **Leibbrand**, Ministerialdirektor;
Dr. Jur. Th. **Kittel** (*), Reichsbahndirektor (member
the Permanent Commission);
Prof. Dr. Ing. eh. W. **Wechmann**, Reichsbahndirek-
;
Dr. Ing. O. **Müller** (*), Reichsbahndirektor (repor-
);
I. **Stroebe** (*), Reichsbahndirektor (reporter);
Dr. Ing. A. **Baumann** (*), Reichsbahndirektor (re-
ter and section secretary);
Dr. Jur. K. **Trierenberg** (*), Reichsbahnoberrat (re-
ter);
Dr. G. **Hein** (*), Ministerialrat (section secretary);
. **Sauer** (*), Ministerialrat (member of the Per-
nent Commission and section secretary).

Autriche (Austria).

Ministère fédéral du Commerce et des Transports:

ng. M. **Prinz**, Sektionschef im Bundesministerium
Handel und Verkehr.

Belgique (Belgium).

Ministère des Transports :

. **Castiau** (*), secrétaire général du Ministère des
nsports (member of the Permanent Commission);
e **Droog**, directeur général au Ministère des Trans-
ts.

Chili (Chile).

I. **Letelier-Espinola**, ingénieur, ex-ministre d'Etat,
nbre du Conseil Supérieur des Chemins de fer;
. **del Campo**, conseiller d'ambassade, délégué per-
nent en Europe des Chemins de fer de l'Etat du
li.

Chine (China).

Ministry of Railways :

r. C. C. **Wang** (*), London representative (mem-
of the Permanent Commission);
. F. **Sandberg**, representative;
Harris, delegate of the Ministry.

Danemark (Denmark).

Ministère des Travaux publics :

Knutzen (*), directeur général des Chemins de
de l'Etat (member of the Permanent Commission);

◆ F. **Hoskiaer**, chef de Département du Ministère des Travaux publics;
◆ C. **Vejre**, secrétaire de l'Union des Employés des Chemins de fer danois.

Egypte (Egypt).

◆ **Khalil Fahmy Hussein Bey**, assistant general manager, State Railways;
◆ Mohamed **Kamal el Khisbin Bey**, general secretary, State Railways;
◆ Mohamed **Sakr Effendi**, divisional assistant locomotive superintendent, Lower Egypt (State Railways).

Finlande (Finland).

◆ H. **Holma**, envoyé extraordinaire et Ministre Plénipotentiaire de Finlande à Paris.

France, Protectorats et Colonies (France, Protectorates and Colonies).

A. — FRANCE.

Ministère des Travaux publics :

◆ M. **Bedouce** (*), Ministre des Travaux publics (president of the French Local Organising Commission);
◆ **Weil-Rabaud**, chef du cabinet du Ministre des Travaux publics;
◆ **Charlot** (*), président du Conseil supérieur des Chemins de fer (member of the French Local Organising Commission);
◆ **Tissier**, vice-président du Conseil d'Etat, président du Comité consultatif des Chemins de fer;
◆ **Grimpret** (*), conseiller d'Etat, secrétaire général du Ministère des Travaux publics, chargé de la Direction générale des Chemins de fer (member of the Permanent Commission and of the French Local Organising Commission);
◆ **de Ruffi de Pontevès** (*), inspecteur général des Mines, directeur du Contrôle du travail des agents de chemins de fer (member of the Permanent Commission and of the French Local Organising Commission);
◆ **Gilles-Cardin** (*), inspecteur général des Ponts et Chaussées, directeur du Contrôle de l'Exploitation commerciale des Chemins de fer (member of the French Local Organising Commission);
◆ **Baticle** (*), ingénieur en chef des Ponts et Chaussées, directeur du Contrôle de l'Exploitation technique et du Matériel et de la Traction (member of the French Local Organising Commission);
◆ **Gerdès** (*), inspecteur général des Ponts et Chaussées, directeur du Contrôle de la Voie et des Bâtiments et des Lignes nouvelles (member of the French Local Organising Commission);
◆ **Moroni**, directeur adjoint des Chemins de fer;
◆ **Robert**, ingénieur en chef des Ponts et Chaussées, adjoint à la Direction générale des Chemins de fer;
◆ **Bichelonne**, ingénieur des Mines, adjoint à la Direction générale des Chemins de fer;
◆ **Jacquet**, membre du Conseil supérieur des Chemins

de fer, représentant la Fédération des Syndicats des Cadres;

◆ **Jarrigion**, membre du Comité consultatif des Chemins de fer, représentant la Fédération Nationale des Travailleurs des Chemins de fer;

◆ **Richard**, ingénieur en chef des Mines, commissaire en chef au Contrôle de l'Exploitation technique des Chemins de fer;

◆ **Raby**, ingénieur en chef des Mines, commissaire en chef du Contrôle de l'Exploitation technique des Chemins de fer;

◆ **Reufflet**, ingénieur en chef des Mines, commissaire en chef au contrôle de l'Exploitation technique des Chemins de fer;

◆ **Créange**, ingénieur en chef des Ponts et Chaussées, commissaire en chef au Contrôle de l'Exploitation technique des Chemins de fer;

◆ **Godin**, ingénieur des Ponts et Chaussées, commissaire au Contrôle de l'Exploitation technique des Chemins de fer;

◆ **Prot**, ingénieur des Ponts et Chaussées, commissaire au Contrôle de l'Exploitation technique des Chemins de fer;

◆ **Charbonneaux**, ingénieur des Mines, commissaire au Contrôle de l'Exploitation technique des Chemins de fer.

◆ **Dodu**, ingénieur des Mines, commissaire au Contrôle de l'Exploitation technique des Chemins de fer.

B. — PROTECTORATES AND COLONIES.

Tunis.

Regency :

◆ **Buovolo**, directeur des Travaux publics de la Régence.

Grande-Bretagne et Inde (Great Britain and India).

A. — GREAT BRITAIN.

Ministry of Transport :

◆ Sir Cyril **Hurcomb** (*), K.B.E., C.B., secretary to the Ministry of Transport (member of the Permanent Commission);

◆ Lt. Col. A. H. L. **Mount**, C.B., C.B.E., chief inspecting Officer of Railways, Ministry of Transport;

◆ I. **Marchbank**, member of the Ministry of Transport.

B. — INDIA.

Railway Department (Railway Board) :

◆ Colonel H. L. **Woodhouse**, director of Civil Engineering, Railway Board;

◆ F. D'Sousa, directeur of Traffic, Railway Board;

◆ G. C. **Laughton**, senior Government inspector of Railways;

◆ T. G. **Creighton**.

Italie (Italy).

Ministère des Communications :

◆ H. Exc. On. Avv. M. **Jannelli**;

◆ On. Avv. F. **Pennavaria**;

◆ Dr. A. **Crispo**;

◆ Ing. G. **Salvini**;

◆ Prof. Ing. F. **Tajani**.

Japon (Japan).

Department of Railways :

◆ Y. **Hashiguchi** (*), chief of the Railway Resear Office (reporter);

◆ M. **Iwamura** (*), secretary, Government Railwa (member of the Permanent Commission);

◆ A. **Yamaguchi**, secretary, Government Railways;

◆ I. **Horikoshi**, engineer, Government Railways;

◆ R. **Asamura**, engineer, Government Railways;

◆ S. **Hayashi**, engineer, Government Railways;

◆ F. **Minoda**, secretary, Japanese Embrassy in Par

Luxembourg (Luxemburg).

Direction générale des Travaux publics :

◆ M. **Dumont**, premier commissaire du Gouverneme Luxembourgeois pour les Chemins de fer.

Norvège (Norway).

Ministère des Travaux publics :

◆ O. **Storsand**, directeur des Chemins de fer de l'Et

Pays-Bas (Netherlands).

Ministère du Waterstaat :

◆ Th. M. B. **van Marle** (*), inspecteur generaal v het Verkeer, Rijksverkeersinspectie (member of t Permanent Commission);

◆ P. **Moltmaker**, membre de la Première Chamb des Etats Généraux.

Pologne (Poland).

Ministère des Communications :

◆ H. E. A. **Bobkowski**, sous-secrétaire d'Etat au M nistère des Communications;

◆ **Jezierski** (*), conseiller ministériel au Ministère d Communications (member of the Permanent Comm sion).

Portugal

Ministère du Commerce et des Communicatio

◆ R. **da Costa Couvreur** (*), ingénieur, inspecte secrétaire général au Ministère des Travaux publ et des Communications (member of the Perman Commission);

◆ Ing. R. V. **Ramalho**, directeur général de Chem de fer, vice-président du Conseil supérieur des Ch mins de fer;

◆ Ing. R. S. do Vale **Monteiro**, chef du départem des Voies et Travaux de la Direction générale Chemins de fer;

◆ Ing. H. S. **da Costa e Souza**, ingénieur de premi classe au Département d'Exploitation et Statistique la Direction générale des Chemins de fer.

◆ Ing. E. **de Oliveira Rocha**, chef du Département matériel roulant de la Direction générale des Chem de fer;

◆ Ing. J. N. **de Oliveira**, ingénieur civil, membre Conseil supérieur des Chemins de fer;

◆ Ing. A. **Cancela de Abreu**, ingénieur civil, so directeur du Chemin de fer de Lisbonne à Casc député à l'Assemblée nationale.

Siam.

C. P. **Sandberg** (*), representative.
Also represents the Chinese Government.)

Suède (Sweden).

Ministère de l'Intérieur :

. M. **Granholm** (*), directeur général des Chens de fer de l'Etat (member of the Permanent mmission);
ranzen, syndic de la Fédération des Cheminots.

Suisse (Switzerland).

Office fédéral des Transports :

. **Kradolfer** (*), directeur de l'Office fédéral des nsports (member of the Permanent Commission);
. **Thomann**, professeur à l'Ecole polytechnique érale.

Tchécoslovaquie (Czechoslovakia).

Ministère des Chemins de fer :

an **Hondl** (*), directeur des Services du personnel porter);
. **Nossek**, ingénieur, chef du cabinet du Ministre Chemins de fer.

– DELEGATES OF THE AFFILIATED RAILWAY ADMINISTRATIONS.

Allemagne (Germany).

Deutsche Reichsbahn :

r. Ing. eh. J. **Dorpmüller** (*), Minister of Comnications and General Manager of the Deutsche chsbahn (member of the Permanent Commission);
r. Ing. eh. M. **Leibbrand**, Ministerialdirektor;
r. Jur. Th. **Kittel** (*), Reichsbahndirektor (mem- of the Permanent Commission);
rof. Dr. Ing. eh. W. **Wechmann**, Reichsbahnktor;
r. Ing. O. **Müller** (*), Reichsbahndirektor (repor-;
. **Stroebe** (*), Reichsbahndirektor (reporter);
r. Ing. A. **Baumann** (*), Reichsbahndirektor (reer and section secretary);
. **Günther** (*), direktor bei der Reichsbahn (sec- secretary);
r. Jur. K. **Trierenberg** (*), Reichsbahnoberrat (reer);
. G. **Hein** (*), Ministerialrat (section secretary);
Sauer (*), Ministerialrat (member of the Perent Commission, section secretary);
Hamel, Reichsbahnamtsrat;
aülein Liselotte **Otto**, Reichsbahnassistent;
. Ing. G. **Schramm** (*), Reichsbahnrat (section etary);
. Ing. G. **Sommer**, Direktor bei der Reichsbahn;
Wieloch, Reichsbahnamtsrat;
aülein M. **Schütz**. Hauptverwaltungsregistrator;
lger, Reichsbahnoberrat.

Argentine.

Buenos Aires Great Southern Railway :

Lt. Col. W. **Parish**, G.M.G., C.B.E., director;
J. M. **Eddy**, C.B.E., director;
Lt. Col. R. T. **Harper**, O.B.E., director;
◆ N. F. I. **Grey**, secretary;
Hon. Philip **Henderson**, consulting engineer;
N. **Henderson**, consulting engineer;
R. **Mongomery**, chief accountant;
O. **Steven**, chief of operations.

Buenos Aires Western Railway :

Sir Sam **Fay**, director;
R. **Wallace**, chief assistant to chief accountant;
J. W. H. **Rea**, chief mechanical engineer;
W. J. L. **Norwood**, chief of section, accountant's department;
◆ R. **Woolmington**, assistant in Traffic Department;
◆ W. Cyril **Williams**;
R. **Graham**, secretary.

Central Argentine Railway :

◆ W. C. **Holland**, chief of Tariffs;
◆ E. **Myatt**, traction superintendent;
◆ H. **Francis**, chief of the Expenditure Audit.

Chemins de fer de Rosario à Puerto Belgrano :

◆ G. **Verstraete**, président du conseil d'administration;
◆ R. **de Tilly**, administrateur-délégué;
◆ Baron **d'Ornellas**, Charles, administrateur.

Chemins de fer de la province de Santa-Fé :

L. **Wibratte**, président du conseil d'administration;
◆ A. **Roudy**, vice-président du conseil d'administration;
M. **Peychez**, administrateur directeur général;
◆ J. **Boissonnas**, administrateur;
◆ P. **Bouju**, administrateur;
H. **Puerari**, administrateur.

Autriche (Austria).

Chemins de fer Fédéraux autrichiens :

◆ F. **Stockinger**, Bundesminister a D.; President;
◆ A. **Schöpfer**, General-Direktor;
◆ Dr. W. **Rauscher** (*), Kommerzieller Direktor (member of the Permanent Commission);
◆ E. **Kaan** (*), Elektrisierungsdirektor (reporter);
◆ Ing. A. **Hassa**, Bauart.

Belgique et Colonie (Belgium and Colony).

A. — BELGIUM.

Société Nationale des Chemins de fer belges :

◆ N. **Rulot** (*), directeur général (president of the Permanent Commission);
◆ **Lemaire** (*), directeur du Service de la Voie (member of the Permanent Commission and reporter);
◆ **Colle** (*), ingénieur principal au Service de l'Exploitation (reporter);

◆ **De Greef** (*), ingénieur au Service de la Voie (reporter);
◆ **Olivier**, ingénieur principal au Service de la Voie;
◆ **Badot**, inspecteur principal au Service de l'Exploitation;
◆ **Demaret**, inspecteur principal au Service de l'Exploitation;
◆ **Fontaine**, ingénieur au Service du Matériel;
◆ **Renier**, inspecteur technique au Service de la Voie;
◆ **Van der Borght**, chef de station de première classe;
◆ **Desprets**, ingénieur principal au Service de la Voie;
◆ **Op 't Einde**, ingénieur principal au Service du Matériel;
Westendorp, inspecteur principal à la Direction du Matériel.

Chemin de fer de Malines à Terneuzen :

◆ H. **Verwilghen**, président du conseil d'administration.

Chemin de fer Nord-Belge :

◆ A. **de Spirlet** (*), inspecteur général (member of the Permanent Commission);
◆ R. **Mayer**, vice-président du conseil d'administration.

Société Nationale des Chemins de fer vicinaux :

◆ A. **De Bruyne**, administrateur;
◆ L. **Jacobs** (*), directeur général (member of the Permanent Commission);
◆ E. **Van Noorbeeck** (*), directeur (reporter);
◆ A. **Allard** (*), directeur (principal secretary);
◆ G. **De Smedt**, directeur;
◆ F. **Laurent**, directeur;
◆ E. **Valcke**, directeur;
◆ C. **Perdieus**, inspecteur principal.

Compagnie générale d'entreprises électriques et industrielles « Electrobel » :

◆ G. **Ithier**, vice-président.

Railways Economiques de Liége-Seraing et extensions :

◆ R. **Haerens**, administrateur.

Compagnie belge de Chemins de fer et d'entreprises :

◆ L. **Wiener**, administrateur.

B. — COLONY.

Chemin de fer du Bas-Congo au Katanga :

◆ G. **Olyff**, administrateur;
◆ P. **Gillet**, administrateur-directeur;
◆ O. **Jadot**, administrateur-directeur général;
◆ E. **Kirsch**, secrétaire général;
◆ P. **Sorel**, ingénieur, chef de service;
◆ M. **Van Mulders**, ingénieur, chef de service;
◆ Ch. **Delelienne**, ingénieur, chef de service.

Office d'exploitation des transports coloniaux « Otraco » :

◆ P. **Charles**, président du conseil d'administration;
◆ Général F. W. **Olsen**, administrateur;
◆ **Baillieux**, administrateur gérant;
◆ P. **Gillet** (*), président du comité de directi (also represents the *Chem. de fer du Bas-Congo Katanga*).

Chemins de fer du Congo supérieur aux Gran Lacs africains :

C. **Camus**, directeur général.

Chemins de fer vicinaux du Congo :

◆ A. **Liénart**, administrateur directeur;
J. **Lagrange**, administrateur directeur;
◆ M. **Duquesne**, ingénieur.

Brésil (Brazil).

Great Western of Brazil Railway :

W. M. **Codrington**, director;
N. B. **Dickson**, director;
A. J. **Medlycott**, secretary;
◆ Ch. Th. **Burns**, accountant;
Dr. E. **Gudin**, resident director.

Bulgarie (Bulgaria).

Chemins de fer de l'Etat :

◆ G. **Sgoureff** (*), directeur général adjoint (mem of the Permanent Commission);
◆ **Philipoff**, ingénieur en chef.

Chili (Chile).

Nitrate Railways :

W. J. **Welch**, director;
◆ Capt. D. W. **Barker**, director;
D. C. **Buttle**, director.

Taltal Railways :

W. W. **Parish**, director;
◆ D. R. **Finnis**, secretary.

Chine (China).

Lunghai Railways :

◆ Dr. C. C. **Wang** (*), representative of the Chi Ministry of Railways in England (member of Permanent Commission of the Association, also c gated by the Chinese Government);
◆ C. P. **Sandberg** (*), C.B.E., consulting engi (also represents the Chinese Government and Siamese Government);
◆ H. H. **Niu**, delegate of the Chinese Govern Railways.

Peking-Hankow Railways :

See *Lunghai Railways.*

Compagnie Générale de Chemins de fer e Tramways en Chine :

A. **Disière**, administrateur-délégué;
◆ F. **Bombart**, sous-chef de service.

South Manchuria Railway :

S. **Kosuge**, representative;
S. **Suzuta**, representative;
T. **Yamanouchi**, representative;
T. **Ozawa**, representative.

Colombie (Columbia).

Société Nationale de Chemins de fer en Colombie:

Ch. **Janssens**, administrateur-délégué;
J. **Ortmans**, administrateur;
A. **Gysels**, chef de service.

Danemark (Denmark).

Chemins de fer de l'Etat :

E. D. **Terkelsen**, directeur du personnel et de la nptabilité;
D. H. **Munck**, directeur du Matériel et de la Trac- n;
W. **Herschend**, chef de district;
. F. **Engqvist**, ingénieur en chef de la Construction.

Chemin de fer privé d'Aalborg :

V. **Jordan**, rédacteur;
. A. **Larsen**, docteur vétérinaire.

Chemins de fer de l'Est de Seeland :

e sénateur P. J. **Jensen-Stevns**, président du con- l.

Chemins de fer de la Fionie méridionale :

. **Nielsen**, membre du conseil général;
. **Hansen**, directeur en chef.

Egypte (Egypt).

State Railways :

halil Fahmy **Hussein** Bey (*), deputy general nager (also delegated by the Egyptian Govern- nt);
Iohamed **Kamal el Kishin** Bey (*), general secre- y (also delegated by the Egyptian Government);
Iohamed **Sakr** Effendi, divisional locomotive su- intendent, Lower Egypt (also delegated by the ptian Government).

Etats-Unis d'Amérique (United States of America).

Bessemer and Lake Erie Railroad :

R. **White**.

Pennsylvania Railroad Company :

D. **Young**, vice-president, Purchases, Stores and rance;
. C. **Watson**, chief engineer, New York Zone;
. R. **Elsey**, mechanical engineer;
D. **Davis**, general superintendent, Northern Divi- ;
. J. **Ball**, foreign freight traffic manager;
. H. **Barnes**, general european agent.

Finlande (Finland).

Chemins de fer de l'Etat :

◆ V. **Jansson**, directeur en chef;
◆ L. **Arvonen**, ingénieur de la voie;
◆ L. **Ilmoniemi**, ingénieur de la voie;
◆ Y. **Karasjoki**, ingénieur mécanicien.

France, Protectorats et Colonies (France, Protectorates and Colonies).

A. — FRANCE.

Chemins de fer de l'Etat :

R. **Dautry** (*), directeur général (member of the Permanent Commission and of the Local Organizing Commission);
◆ P. **Lévy**, ingénieur en chef attaché à la direction;
◆ J. **Girette**, ingénieur en chef adjoint attaché à la direction;
◆ J. **Antonini**, secrétaire général;
A. **Lemonnier** (*), chef de l'Exploitation (reporter);
◆ E. **Hauterre**, chef adjoint de l'Exploitation;
◆ F. **Chevreau**, ingénieur en chef adjoint de l'Exploitation;
◆ R. **Soulard**, ingénieur en chef adjoint de l'Exploitation;
◆ J. **Lévy** (*), chef du Service du Matériel et de la Traction (reporter);
◆ P. **Bertrand**, ingénieur en chef adjoint du Service du Matériel et de la Traction;
◆ F. **Hébert**, ingénieur en chef adjoint du Service du Matériel et de la Traction;
◆ V. **Nicolet**, ingénieur en chef adjoint du Service du Matériel et de la Traction;
◆ A. **Porchez** (*), chef du Service de la Voie, des Bâtiments et de la Construction des lignes nouvelles (member of the French Local Organizing Commission);
◆ R. **Lévi**, chef adjoint du Service de la Voie, des Bâtiments et de la Construction des lignes nouvelles;
◆ R. **Chrétien**, ingénieur en chef adjoint du Service de la Voie, des Bâtiments et de la Construction des lignes nouvelles;
◆ **Walter** (*), chef de division adjoint au Service de la Voie (section secretary).

Chemins de fer d'Alsace et de Lorraine :

◆ F. **Surleau** (*), directeur (member of the Permanent Commission and of the French Local Organizing Committee);
◆ A. **Grandjean** (*), ingénieur en chef de l'Exploitation (reporter);
◆ H. **Bauer** (*), président du Conseil de Réseau (member of the French Local Organizing Commission);
◆ G. **Dayras**, membre du Conseil de Réseau;
◆ Ch. **Ackermann**, ingénieur en chef de la Voie et des Bâtiments;
◆ Ch. **Regnauld**, ingénieur en chef du Matériel et de la Traction;
◆ H. **Lang**, ingénieur en chef adjoint de la Voie et des Bâtiments;
◆ H. **Wisdorff**, ingénieur en chef adjoint du Matériel et de la Traction;
◆ **Schutz** (*), ingénieur principal aux Services Techniques de l'Exploitation (section secretary);
◆ **Emering** (*), inspecteur au Service du Matériel et de la Traction (section secretary).

Chemins de fer de l'Est :

L. **Marlio** (*), président du Conseil d'Administration (member of the French Local Organizing Commission);
◆ R. **Fabry**, vice-président du Conseil d'Administration;
◆ E. **Pellarin** (*), directeur (member of the Permanent Commission and of the French Local Organizing Commission);
◆ R. **Barth** (*), ingénieur en chef à la Direction (member of the French Local Organising Commission);
◆ R. **Renard**, ingénieur en chef de l'Exploitation;
◆ P. **Bouché-Leclercq**, ingénieur en chef de la Voie et des Travaux;
◆ M. **Poncet**, ingénieur en chef du Matériel et de la Traction;
◆ G. **Legoux**, ingénieur en chef, adjoint au directeur;
◆ H. **Bigot**, ingénieur en chef-adjoint du Matériel et de la Traction;
◆ R. **Chauvigné**, chef-adjoint de l'Exploitation;
◆ J. **Ridet** (*), ingénieur en chef-adjoint de la Voie et des Travaux (reporter);
◆ E. **Devoucoux**, ingénieur en chef-adjoint de la Voie;
◆ G. **Lanos**, ingénieur en chef-adjoint de la Voie.

Chemins de fer du Midi :

Tirard (*), président du Conseil d'Administration (member of the French Local Organizing Commission);
◆ **Moreau-Néret**, vice-président du Conseil d'Administration;
◆ **Gufflet** (*), directeur honoraire (member of the Permanent Commission);
◆ **Leclerc du Sablon** (*), directeur (member of the French Local Organizing Commission);
Renault, ingénieur en chef à la Direction générale;
◆ **Bruneau**, ingénieur en chef-adjoint au chef du Service de l'Exploitation;
◆ **Barois** (*), ingénieur principal attaché au Service central du Matériel et de la Traction (secretary of the French Local Organizing Committee);
◆ **Bouteloup**, chef-adjoint du Service de la Voie et des Travaux;
◆ **Dreyfus**, ingénieur en chef du Service central de l'Exploitation;
◆ **Coullié**, ingénieur en chef-adjoint au chef du Service de la Voie et des Travaux;
◆ **Villeneuve**, ingénieur chef-adjoint du Service Electrique (Matériel et Traction).

Chemin de fer du Nord :

A. **Bourgeois**, administrateur;
◆ P. **Getten**, administrateur;
◆ J. **Goursat**, ingénieur en chef de l'Exploitation;
◆ P. **Lancrenon**, ingénieur en chef du Matériel et de la Traction;
◆ A. **Lamarque**, ingénieur en chef attaché à la Direction de l'Exploitation;
◆ A. **Latrasse**, ingénieur en chef-adjoint de l'Exploitation;
◆ A. **Lévy**, ingénieur en chef-adjoint de l'Exploitation;
◆ E. J. **Guillaume**, ingénieur en chef de l'Entretien;
◆ **Le Besnerais** (*), directeur de l'Exploitation (vice-president of the Permanent Commission, and member of the French Local Organizing Commission);
◆ **Cambournac** (*), ingénieur en chef des Travaux de la Surveillance (member of the French Local Org nizing Committee);
◆ **Dumas** (*), ingénieur en chef-adjoint du Matér et de la Traction (reporter);
◆ **Flament** (*), ingénieur en chef-adjoint des Trava et de la Surveillance (reporter);
◆ **Chaperon** (*), chef des services administratifs (se tion secretary).

Chemin de fer de Paris à Orléans :

◆ **Richemond** (*), président du Conseil d'Administr tion (member of the French Local Organizing Co mission);
◆ **Bénac**, vice-président du Conseil d'Administrati
Roume, vice-président du Conseil d'Administrati
◆ **Henry-Gréard** (*), directeur de la Compag (member of the Permanent Commission and of French Local Organizing Commission);
◆ **de Boysson** (*), directeur-adjoint (secretary of French Local Organizing Commission);
◆ **Epinay**, chef du Service de l'Exploitation;
◆ **Balling**, chef du Service de la Voie et des Trava
◆ **Cardon**, chef du Service du Matériel et de la Tr tion;
◆ **Degardin**, ingénieur en chef du Service central l'Exploitation;
◆ **Martin**, chef-adjoint du Service du Matériel et la Traction;
◆ **Boistel d'Welles**, ingénieur en chef du Service c tral de l'Exploitation;
◆ **Bloch**, ingénieur en chef des Services du Maté et des Ateliers;
◆ **Berthelot**, chef du Trafic;
◆ **Dugas** (*), ingénieur en chef du Service des M chines (reporter);
◆ **Gilmaire** (*), ingénieur principal du Service cen de l'Exploitation (reporter);
◆ **du Plessis d'Argentré** (*), chef du Service des C vres sociales (secretary of the French Local O nizing Commission);
◆ **Barillot**, ingénieur, chef du Service électrique;
◆ **Chapelon**, ingénieur, chef-adjoint des Etudes Matériel.

Chemins de fer de Paris à Lyon et à la M terranée :

A. **Lebon** (*), président du Conseil d'Adminis tion (member of the French Local Organizing C mission);
◆ **Mugniot** (*), directeur général (member of Permanent Commission and of the French Local ganizing Commission);
◆ **Boyaux**, ingénieur en chef-adjoint de l'Exploitat
◆ **Dargeou**, chef-adjoint de l'Exploitation;
◆ **Bocquet**, sous-chef de l'Exploitation;
◆ **Japiot**, ingénieur en chef, Matériel et Traction;
◆ **Chambon**, ingénieur en chef-adjoint, Matérie Traction;
Richon, ingénieur en chef de la Traction;
◆ **Armand**, ingénieur principal au Service central, tériel et Traction;
◆ **Gérin**, ingénieur en chef du Service de la Voie
◆ **Hachon**, ingénieur en chef-adjoint du Service Voie;
◆ **Desaleux**, ingénieur en chef attaché au Se central de la Voie;
◆ **Bastien**, ingénieur en chef attaché au Service tral de la Voie;

Martinet (*), ingénieur en chef attaché à la Direc-
n (member of the French Local Organizing Com-
ssion);
Tuja (*), ingénieur en chef de l'Exploitation (repor-
);
Parmantier (*), ingénieur en chef du Matériel (re-
rter);
Santini (*), ingénieur, chef de la Division des Com-
stibles (section secretary);
Mange (*), inspecteur principal au Service de l'Ex-
itation (section secretary);
Duchatel (*), inspecteur adjoint du Contrôle des
avaux extérieurs (section secretary).

Chemins de fer du Cambrésis :

Ch. I. **Rey**, administrateur-délégué.

Chemins de fer départementaux :

de Roquemaurel, administrateur, président;
Zens, administrateur-délégué;
Béghin (*), administrateur-directeur (member
the French Local Organizing Commission);
M. **de Roquemaurel**, administrateur, sous-direc-
r;
Zens, administrateur, ingénieur en chef de la
iction.

Société Générale des Chemins de fer économiques :

Delille (*), directeur (reporter and member of
French Local Organizing Commission);
Joubert, président du Conseil d'Administration;
Berthelier, vice-président du Conseil d'Adminis-
tion;
Auriol, administrateur;
de Waru, administrateur;
Grignon, sous-directeur;
de Chevigné, secrétaire général;
h. **Clément**, ingénieur en chef de l'Exploitation;
Ferreaud, ingénieur en chef du Service du Maté-
et de la Traction.

Chemins de fer économiques du Nord :

Mullet, administrateur.

Voies ferrées des Landes :

audy, chef de la comptabilité générale;
arenc, chargé des Services techniques.

Chemins de fer secondaires du Nord-Est :

Jourdain (*), administrateur-délégué (member
he French Local Organizing Commission);
Vincent, directeur;
Mariolle, ingénieur adjoint au directeur.

Chemin de fer de Somain à Anzin et à la Frontière belge :

Pauzat, directeur général.

Compagnie Générale des Chemins de fer vicinaux :

Bouteau, administrateur-directeur;
Bourdeaux, directeur de l'Exploitation;
Masson, directeur de l'Exploitation.

Compagnie Générale des Voies ferrées d'intérêt local :

◆ F. **Level**, président, administrateur-délégué;
◆ E. **Ytasse**, sous-directeur.

Régie Départementale des Tramways de l'Ain :

◆ G. **Loiseau**, président du Conseil d'Administration;
◆ F. **Malgoire**, directeur.

Tramways Départementaux des Deux-Sèvres :

◆ G. **Tartary**, président du Conseil d'Administration.

Tramways de l'Indre :

◆ A. **Andriveau**, administrateur-délégué.

Chemin de fer Métropolitain de Paris :

◆ P. **Martin** (*), administrateur-délégué, directeur général (member of the French Local Organizing Commission);
◆ E. A. **Joly**, ingénieur en chef du Service technique.

B. — COLONIES.

Chemins de fer Algériens. (Joint management of the Algerian State Railways and Algerian Lines of the P. L. M. Company) :

Ardoin, directeur;
Ducluzeau, ingénieur en chef, adjoint au directeur;
◆ **Jouaville**, ingénieur en chef, adjoint au directeur;
◆ **Lecoanet**, chef du Service de la Voie;
Carles, vice-président du Conseil de Réseau des Chemins de fer Algériens de l'Etat;
◆ A. **Jourdain**, sous-directeur de la Compagnie P.L.M., Paris;
◆ **Renevey**, directeur de l'Office Central d'Etudes de Matériel de Chemins de fer.

Chemin de fer de Gafsa :

M. **Pellé**, administrateur-délégué;
◆ F. **Breynaert**, directeur.

Compagnie Fermière des Chemins de fer Tunisiens :

E. **Herscher**, président du Conseil d'Administration;
◆ A. **Collin**, administrateur-délégué;
◆ G. **Pezet**, ingénieur en chef de la direction;
◆ J. **Masseron**, ingénieur au Service de la Voie et des Travaux;
◆ R. **Bertrand**, ingénieur au Service de l'Exploitation.

Chemins de fer coloniaux de l'Afrique Occidentale française et Togo :

◆ **Jacquinot**, ingénieur en chef des Travaux publics;
◆ **Lagarde**, ingénieur en chef des Travaux publics de l'A. O. F.

Chemins de fer de l'Afrique Equatoriale française et Cameroun :

◆ **Blosset**, ingénieur en chef des Ponts et Chaussées;
◆ **Pascal**, ingénieur des Travaux publics des Colonies.

Chemins de fer de Madagascar :

Mazen, ingénieur des Ponts et Chaussées;
◆ **Reydellet**, ingénieur des Travaux publics des Colonies.

Chemin de fer Franco-Ethiopien de Djibouti à Addis-Abeba :

G. **Camut**, administrateur, directeur général;
◆ M. **Rousset**, directeur-adjoint de l'Exploitation;
◆ P. **du Bousquet**, ingénieur en chef.

Chemins de fer du Maroc :

◆ M. **Margot**, président du Conseil d'Administration;
A. **Guerin**, directeur général;
Simeray, directeur de l'Exploitation.

Chemin de fer du Port et de la Pointe des Galets :

◆ G. **Labbé**, ingénieur en chef du Contrôle des Chemins de fer Coloniaux au Ministère des Colonies de France.

Chemin de fer de Damas-Hama et prolongements :

◆ D. **Bourgeois**, administrateur-délégué;
◆ L **Chenut**, administrateur;
◆ J. **Coster**, administrateur.

Chemins de fer Coloniaux de l'Indochine :

◆ J. **Camus**, ingénieur des Ponts et Chaussées, Inspection générale des Travaux publics de l'Indochine;
◆ **Malacam**, ingénieur des Travaux publics.

Compagnie française des Chemins de fer de l'Indochine et du Yunnan :

◆ R. **Brouillet**, administrateur-délégué;
◆ A. **Bodin**, directeur général;
◆ R. **Mermilliod**, secrétaire général.

Grande-Bretagne, Nord de l'Irlande, Inde, Dominions, Protectorats et Colonies (Great-Britain, Northern Ireland, India, Dominions, Protectorates and Colonies).

A. — GREAT BRITAIN AND NORTHERN IRELAND.

Great Western Railway :

◆ Ch. Joc. **Hambro**, M. C., deputy chairman;
◆ G. F. **Luttrell**, J. P., director;
◆ Sir James **Milne**, K.C.V.O., C.S.I., general manager;
◆ Sir Ralph **Cope**, chief accountant;
◆ F. R. Ed. **Davis**, C.B.E., secretary;
◆ A. **Maynard**, chief goods manager;
◆ F. R. **Potter**, superintendent of the line;
◆ C. R. **Dashwood**, O.B.E., assistant general manager;
◆ R. **Carpmael**, O.B.E., chief engineer;
◆ J. A. **Kay**, agent.

London Midland and Scottish Railway :

(Including G. C. & Midland Joint Ry. and Midland & G. N. Joint Ry.)

◆ D. **Vickers** (*), director (member of the Perman Commission);
◆ Ashton **Davies** (*), chief commercial manager (porter);
◆ C. E. **Fairburn** (*), chief electrical engineer (porter);
◆ E. B. **Fielden**, director;
◆ M. V. **Wood**, vice-president;
◆ Sir Harold **Hartley**, vice-president and director Scientific Research;
◆ H. L. **Thornhill**, chief legal advisor;
◆ O. G. **Roberts**, secretary and assistant to preside
H. V. **Mosley**, chief executive officer for new Wo and Parliamentary Business;
◆ J. **Ballantyne**, chief officer for Scotland;
◆ A. F. **Bound**, signal and telegraph engineer;
◆ W. A. **Stanier**, chief mechanical engineer;
◆ W. K. **Wallace**, chief civil engineer;
◆ W. H. C. **Clay**, estate manager;
Darbyshire, chief officer for Labour & Establi ment;
◆ S. J. **Symes**, chief stores superintendent;
A. W. **Gray**, secretary, Institute of Transport;
◆ D. R. **Lamb**, observer;
◆ K. R. N. **Speir**, assistant to chief commercial nager;
◆ J. W. **Whiteside** (*), drawing office, chief mec nical engineer's department (section secretary);
◆ B. **Harper** (*) (section secretary).

London and North Eastern Railway :

Sir Christopher **Needham**, director;
◆ The Rt. Hon. Lord **Burghley**, M. P., director;
◆ Sir Ralph **Wedgwood** (*), C.B., C.M.G., chief gen manager (member of the Permanent Commission
◆ Sir Nigel **Gresley** (*), C.B.E., chief mechanical e neer (member of the Permanent Commission reporter);
◆ O. **Bulleid**, assistant to chief mechanical engin
◆ Ch. H. **Newton**, divisional general manager;
◆ A. L. **Gibson**, continental traffic manager;
◆ C. **Dandridge**, G.G., advertising manager;
◆ V. M. **Barrington-Ward** (*), superintendent (re ter);
◆ C. J. **Selway**, C.B.E., passenger manager;
◆ Ed. M. **Rutter**, passenger manager;
◆ A. E. **Sewell**, goods manager;
◆ W. A. **Fraser** (*), engineer (reporter);
◆ C. E. R. **Sherrington**, M.C., M.A., secretary, Rail Research Service;
◆ H. A. **Watson**, C.B.E., light railway consultant;
◆ Ch. J. **Brown**, engineer;
R. **Hart-Davies**, assistant to chief mechanical e neer;
◆ A. E. **Beresford** (*) (section secretary);
◆ D. J. **Carling** (*) (section secretary).

Southern Railway :

◆ The Right Hon. Lord **Rockley** (*), P.C., G. director (member of the Permanent Commission):
◆ Sir Herbert **Walker**, K.C.B., general manager;
◆ G. S. **Szlumper**, assistant general manager;
E. J. **Missenden**, traffic manager;
◆ G. **Ellson** (*), chief engineer (reporter);
R. E. L. **Maunsell**, chief mechanical engineer.

Cheshire Lines Committee :

G. **Leedam**, secretary and manager.

Great Northern Railway (Ireland):

J. B. **Stephens**, general manager;
G. B. **Howden**, chief engineer;
W. B. **Carson**, chairman.

London Passenger Transport Board:

A. R. **Cooper**, chief engineer;
W. S. **Graff-Baker**, B. Sc., chief mechanical engineer (Railways).

County Donegal Rys. Joint Committee (Ireland):

H. **Forbes**, secretary and manager;
C. J. **Forbes**, assistant.

B. — INDIA, DOMINIONS, PROTECTORATES AND COLONIES.

Kenya & Uganda Railways:

A. Ed. **Hamp**, chief engineer;
Ch. A. G. **Jouanno**, chief locomotive draughtsman;
J. R. **Farquharson**, senior assistant engineer;
K. B. **Cockle**, assistant engineer;
H. W. **Cox**, senior assistant accountant;
J. W. **Terrington**, district traffic superintendent.

South African Railways and Harbours:

Th. H. **Watermeyer**, general manager;
W. A. J. **Day**, chief mechanical engineer;
J. M. **Greathead**, assistant chief civil engineer;
Ph. D. **Troskie**, chief superintendent (Staff);
Th. Ch. **Swallow**, advisory engineer, Office of the gh Commissioner for the Union of South Africa;
E. J. **Park**, secretary to general manager;
J. R. **Naisby**, secretary;
Dr. **von Abo**, secretary.

Sudan Railways:

W. H. **Mackenzie-Brown**, assistant chief engineer;
R. H. **Robertson**, maintenance engineer;
C. R. **Williams**, assistant chief mechanical engineer;
G. K. **Wood**, district locomotive superintendent;
R. L. **Hill**, assistant commercial superintendent;
. L. **Willoughby**, assistant port manager.

Ceylon Government Railway:

V. G. **Hills**, acting general manager;
V. A. **Shaw**, district engineer.

Bengal Nagpur Railway:

. **Goddard**, works manager;
. **O'Hanlon Morrisson**, district engineer;
. H. **Duncan**, assistant transportation officer;
. S. **Iyer**, district commercial officer;
. W. **Heanly**, assistant commercial officer.

Bengal and North Western Railway:

t. Col. T. **Gracey**, chairman;
ir James **Williamson**, managing director;
. T. S. **Cairns**, district locomotive superintendent;
. F. D. **Wightwick**, district traffic superintendent;
. D. **Craig**, assistant locomotive superintendent.

Bombay, Baroda and Central India Railway:

◆ Major A. D. G. **Shelley**, chairman;
◆ S. G. S. **Young**, director;
◆ J. S. **Tritton**, consulting engineer.

Burma Railways:

◆ N. **McAllister**, assistant engineer;
◆ J. **Hossack**, assistant engineer;
R. D. **Cant**, assistant engineer;
◆ G. H. **Binnie**, assistant locomotive superintendent;
◆ O. H. **Glanville**, assistant traffic superintendent.

Eastern Bengal Railway:

◆ Lt. Col. H. H. E. **Gosset**, officiating deputy chief engineer;
R. L. W. **Meehan**, officiating chief mechanical engineer;
◆ C. N. **Silvester**, district locomotive superintendent;
◆ D. **Macauley**, district locomotive superintendent.

East Indian Railway:

◆ E. H. N. **Lowther**, M. Inst. T., superintendent, transportation;
◆ E. R. **Casement**, divisional superintendent, Lucknow;
C. O. **Brown**, works manager, Tatanagar;
◆ E. H. B. **Heysham**, superintendent, transportation, Moradabad;
◆ T. T. **Lambe**, assistant superintendent (power);
◆ R. **Bonar**, officiating divisional superintendent;
◆ H. B. **Deshpande**, assistant chemist and metallurgist.

Great Indian Peninsula Railway:

◆ G. E. **Berkley**, deputy traffic manager;
◆ W. B. **Burford**, divisional engineer;
◆ E. L. **Ensor**, senior assistant transportation superintendent (Telegraphs);
◆ W. G. **Alcock**, secretary to the agent;
Ed. Ch. B. **Thornton**, assistant transportation superintendent (Traction) Distribution;
R. **Horsfied**, divisional transportation superintendent;
H. Ch. **Baral**, assistant transportation superintendent (traffic);
◆ H. H. **Gallaghan**, assistant transportation superintendent (traffic);
◆ M. K. **Mohiuddin**, assistant traffic manager;
H. P. **Renwick**, deputy chief transportation superintendent (power).

Madras and Southern Mahratta Railway:

Sir Francis Dundas **Couchman**, K.B.E., director;
◆ M. A. **Walker**, deputy chief operating superintendent (general);
◆ P. **Morris**, assistant mechanical engineer;
◆ H. F. **Edwards**, transportation superintendent (telegraphs);
◆ D. O. **Thomas**, district transportation superintendent (traffic).

North Western Railway (India):

◆ Lt. Col. R. E. **Gordon**, executive engineer;
◆ F. G. **Griffith**, divisional transportation officer;
◆ B. C. L. **Bean**, divisional superintendent;
◆ P. S. A. **Berridge**, executive engineer (bridges);

◆ M. **Meldrum**, assistant transportation officer;

◆ H. W. **Huggins**, deputy chief mechanical engineer;

◆ E. M. **Egan**, divisional transportation officer;

◆ J. **Scruby**, deputy chief engineer;

◆ W. A. **Anderson**, divisional engineer;

Y. P. **Kul-Karni**, assistant executive engineer;

◆ N. **Prem**, inspecting officer, Stores;

◆ A. **Cooper**, deputy chief operating officer;

◆ A. Ed. **Greene**, sleeper control officer.

Rohilkund and Kumaon Railway :

◆ Sir James **Williamson** (*) (also delegated by the *Bengal and North Western Railway).*

South Indian Railway :

Sir Percy **Rothera**, O. B. E., director.

Iraq Railways :

◆ P. A. **Challomer**, chief mechanical engineer;

◆ N. **Hayderi**, assistant electrical engineer;

◆ J. **Toma**, assistant engineer.

New Zealand Government Railways :

◆ R. J. **Harvey** (*), consulting engineer (member of the Permanent Commission).

Grèce (Greece).

Chemins de fer de l'Etat :

◆ C. **Melissinos**, directeur général;

◆ A. **Vlangalis**, membre du Conseil d'Administration;

◆ A. **Stymphaliades**, secrétaire général du Ministère des Chemins de fer.

Chemins de fer Pirée-Athènes-Peloponèse :

Général J. **Petridis**, administrateur-délégué;

◆ G. **Papalexandrou**, sous-chef de l'Exploitation.

Compagnie des Chemins de fer de Thessalie :

◆ Ch. **Drossopoulos**, administrateur-adjoint;

◆ D. **Petsalis**, administrateur, conseiller technique.

Hongrie (Hungary).

Chemins de fer Royaux de l'Etat :

Dr. Othon **de Senn** (*), secrétaire d'Etat, président de la direction (member of the Permanent Commission);

◆ E. **Lux**, directeur-adjoint, conseiller principal du Gouvernement;

◆ E. **Alex**, conseiller principal.

Irlande (Irish Free State).

Great Southern Railways :

Sir Walter **Nugent Bart**, chairman;

◆ Rt. Hon. J. **Mac Mahon**, P. C., director;

◆ J. X. **Murphy**, director;

Dr. W. **Lombard Murphy**, director;

P. J. **Brady**, director;

◆ W. H. **Morton**, general manager;

◆ J. J. **McDonald**, law agent;

◆ H. S. **Coe**, secretary.

Italie (Italy).

Chemins de fer de l'Etat :

◆ Cav. di. Gr. Cr. Ing. L. **Velani** (*), directeur gé ral (member of the Permanent Commission);

Gr. Uff. Ing. B. **Nobili** (*), vice-directeur géné (member of the Permanent Commission);

◆ Gr. Uff. Ing. F. **Fiori** (*), conseiller d'administ tion (member of the Permanent Commission);

◆ Gr. Uff. Avv. G. **Falcone**, chef du Service du p sonnel des affaires générales;

◆ Gr. Uff. Ing. J. **Jacometti**, chef du Service du M tériel et de la Traction;

Gr. Uff. Ing. L. **Maccallini**, chef du Service Co mercial et du Trafic;

Gr. Uff. Ing. L. **Gigli**, chef du Service du M vement;

◆ Comm. Ing. F. **Salvini**, chef de service au Serv des Travaux et Constructions;

◆ **Giovene**, chef de service au Service du Person et des Affaires générales;

Comm. Ing. E. **Virgili**, inspecteur en chef supéri au Service des Travaux et Constructions;

◆ Comm. Dr. A. **Filippini**, inspecteur en chef su rieur à l'Office Central Sanitaire;

◆ Comm. Ing. M. **Fiachetti**, inspecteur en chef à l' fice des Installations Electriques de Signalisation;

Comm. Ing. A. **Cuttica**, inspecteur en chef au S vice du Matériel et de la Traction;

Comm. Ing. M. **de Cornè**, inspecteur en chef Service Commercial et du Trafic;

◆ Comm. Ing. L. **Tosti** (*), chef de service au Ser du Personnel et des Affaires générales (reporter);

◆ Comm. Ing. L. **Belmonte** (*), chef de service Service Commercial et du Trafic (reporter);

◆ Comm. Ing. Al. **Mascini** (*), inspecteur en chef périeur à la section ferroviaire de l'Institut Exp mental (reporter);

◆ Comm. Ing. J. C. **Palmieri** (*), inspecteur en supérieur au Service du Mouvement (reporter);

◆ Comm. Ing. C. **Bellomi** (*), inspecteur en chef périeur au Service des Travaux et Construct (reporter);

◆ Comm. Ing. G. **Minucciani** (*), inspecteur en supérieur à la Section du Matériel et de la Trac (reporter);

E. **La Valle** (*), inspecteur en chef de vigila Inspectorat général des Chemins de fer, Tramway Automobiles (reporter);

◆ E. **Mellini** (*), inspecteur supérieur de vigila Inspectorat général des Chemins de fer, Tramw et Automobiles (reporter);

◆ Gr. Uff. Ing. E. **Ponticelli**, chef du Service des vaux et Constructions;

◆ F . **Farnè.**

Tramways électriques de Brescia :

◆ E. **Denti**, président.

Ferrovie Torino-Nord :

Sig. Cav. E. **Thesia**, administrateur-délégué.

Chemin de fer Circumetnea :

◆ Gr. Uff. M. **Crimi**, administrateur.

Società Trazione Elettrica Lombarda :

◆ M. **Motta**, ingénieur-conseil.

Chemins de fer de la Méditerranée :

Deputato R. **Luzzati**, conseiller-délégué, directeur énéral;
F. **Flamini**, secrétaire général;
M. **de Falco**, directeur, Esercizio Ferrovie Calabro ucane.

Société Nationale de Chemins de fer et de Tramways :

Gr. Uff. E. **Parisi**, président;
Com. L. **Ottone**, conseiller légal.

Chemin de fer du Nord de Milan :

On. Cav. di. Gr. Cr. Dr. Ing. G. **Motta**, président de Compagnie;
Comm. Dr. Ing. C. **Anghileri**, directeur de l'Ex- oitation.

Compagnie générale des Tramways piémontais :

P. **Lo Balbo** (*), administrateur-directeur (repor-);
M. **Requilé**.

Ferrovie del Sud-Est :

Conte Gr. Uff. Avv. U. **Pasquini**, administrateur- légué.

Chemin de fer Suzzara-Ferrara :

Dott. Ing. Cav. G. **Belardini**, directeur de l'Exploi- ion.

Société turinoise de Tramways et de Chemins de fer économiques :

Comm. Dr. Ing. G. **Fuortes**, directeur.

Société vénitienne pour la construction et l'exploitation de Chemins de fer secondaires en Italie :

Prof. Gr. Uff. D. **Poli**, directeur;
ng. Dott. Comm. G. **Fattori**, chef de service;
Cav. Rag. S. **Burlini**, chef de service.

Tramways Vercellesi :

Migliau, directeur.

Japon (Japan).

Government Railways :

. **Hashiguchi** (*), chief of Railway Research Office o delegated by the Japanese Government, and orter);
I. **Iwamura** (*), secretary, Government Railways, nager of Berlin Office (member of the Permanent nmission; also delegated by the Japanese Govern- nt);
. **Yamaguchi** (*), secretary, Government Railways o delegated by the Japanese Government);
. **Hayashi** (*), **engineer**, Government Railways o delegated by the Japanese Government);
. **Horikoshi** (*), engineer, Government Railways o delegated by the Japanese Government);
. **Asamura** (*), engineer, Government Railways o delegated by the Japanese Government);
◆ O. **Tsubota**, secretary, Government Railways;
◆ F. **Tanaka**, secretary, Government Railways;
◆ S. **Satch**, engineer, Government Railways;
◆ H. **Hiki**, engineer, Government Railways.

Government General of Chosen, Railway Bureau :

◆ T. **Tanabe**, secretary.

Luxembourg (Luxemburg).

Chemins de fer Guillaume-Luxembourg :

◆ C. **Cathusier**, ingénieur en chef-adjoint, attaché à la Direction;
◆ Ch. **Spach**, ingénieur en chef-adjoint de l'Exploitation.

Chemins de fer et Minières Prince-Henri :

◆ A. **Sorel**, administrateur-directeur.

Norvège (Norway).

Chemins de fer de l'Etat :

G. **Furuholmen**, directeur;
◆ **Opheim**, chef de bureau gérant;
◆ **Foss**, chef de bureau;
◆ K. **Henriksen**, ingénieur en chef.

Pays-Bas et Colonies (Netherlands and Colonies).

A. — NETHERLANDS.

Chemins de fer Néerlandais (Compagnie pour l'exploitation des Chemins de fer de l'Etat et Chemins de fer hollandais) :

◆ Dr. H. **Van Manen** (*), directeur (member of the Permanent Commission);
◆ Ir. W. **Hupkes**, chef du Service de la Traction et du Matériel;
◆ Ir. Ch. H. J. **Driessen**, chef du Service de la Voie et des Travaux;
◆ Ir. W. F. H. **van Ryckevorsel**, chef du Service Commercial et des Transports;
◆ Ir. Th. W. **Mundt** (*), ingénieur en chef des Ponts et du Service de la Voie (reporter).

B. — COLONIES.

Chemins de fer de l'Etat aux Indes Néerlandaises :

◆ J. F. F. **Götz**, directeur;
◆ J. J. **Heyting**, ingénieur honoraire au Waterstaat des Indes néerlandaises.

Société des Chemins de fer aux Indes néerlandaises :

◆ W. H. **Van Schouwenburg**, ingénieur en chef;
A. J. W. **Vorster**, président du Comité d'Administration à Java.

Tramway à vapeur Semarang-Cheribon :

G. P. J. **Caspersz**, directeur.

Pologne (Poland).

Chemins de fer de l'Etat.
(Ministère des Communications) :

◆ Prof. Ing. A. **Miszke** (*), directeur du Bureau des Etudes et des Projets (reporter);
◆ Ing. S. **Andrzejewski**, directeur du Département;
◆ Ing. Ed. **Barysz**, directeur de division;
◆ Ing. J. **Berkiewicz**, membre du conseil technique;
◆ Ing. W. **Czapski**, membre du conseil technique;
◆ Ing. M. **Ejmont**, conseiller;
◆ Ing. A. **Karlsbad**, directeur du bureau d'électrification du Nœud de Varsovie;
◆ Ing. A. **Krzyzanowski**, président de la Commission des études des prix de revient des transports;
◆ Ing. O. **Ogurek**, conseiller ministériel;
◆ Ing. A. **Tuz**, directeur de division;
◆ Ing. J. **Wagner**, directeur de division;
◆ Ing. St. **Wasilewski**, directeur de division;
◆ Prof. Dr. Ing. A. **Wasiutynski**, vice-président du Conseil technique;
◆ Ing. B. **Cywinski**, président, Commission d'amélioration du fonctionnement des Chemins de fer;
◆ Ing. C. **Landsberg**, secrétaire général, Commission de réduction des dépenses des Chemins de fer;
◆ **Targonski**, chef des Recherches psychotechniques;
◆ **Wisznicki**, ingénieur.

Portugal and Colonies.

A. — PORTUGAL.

Compagnie des Chemins de fer portugais :

◆ Dr. D. **Fezas Vital**, administrateur;
◆ M. **Costa**, administrateur;
◆ V. **Ferreira**, sous-directeur;
◆ J. **Barata**, ingénieur en chef de l'Exploitation;
◆ A. **Ruas**, ingénieur en chef de la Voie et des Travaux;
◆ P. **de Brion**, ingénieur, sous-chef du Matériel et de la Traction.

Compagnie Nationale des Chemins de fer portugais :

P. J. **Diniz**, administrateur-délégué;
◆ M. **Bello**, administrateur.

Chemins de fer portugais de la Beira-Alta :

Ing. F. X. **Esteves**, administrateur-délégué;
◆ F. **d'Arruda**, directeur de l'Exploitation.

Companhia portuguesa para a construção e exploração de caminhos de ferro, Linhas do Vale do Vouga :

◆ C. **Cabral de Figueiredo**, directeur.

B. — COLONIES.

Chemins de fer de l'Etat dans les Colonies portugaises :

◆ Francisco dos Santos **Pinto Teixeira**, directeur des Services des Ports, Chemins de fer et Transports de la Colonie de Mozambique;
◆ A. **Eyrne Pereira**, ingénieur, inspecteur supérieur des Travaux publics;
◆ J. F. **de Sousa**, ingénieur, inspecteur des Trava publics du Conseil supérieur des Chemins de fer;
◆ A. G. de Amorim de **Vasconcelos Porto**, ingénie directeur de l'exploitation des Chemins de fer du N du Portugal.

Chemins de fer du Benguela :

G. **Cabral**, directeur;;
◆ J. D. **Ferreira**, ingénieur;
◆ C. M. **Torres**, ingénieur.

Ports et Chemins de fer du Mozambique :

◆ Major Francisco dos Santos **Pinto Teixeira** (*), recteur général (also delegated by the State Railw in the Portuguese Colonies).

Roumanie (Rumania).

Chemins de fer de l'Etat :

◆ G. **Panaitopol**, directeur général adjoint;
◆ V. **Stoika**, directeur de l'Entretien;
◆ A. **Zarifopol**, directeur du Mouvement.

Suède (Sweden).

Chemins de fer de l'Etat :

◆ J. A. **Valentin**, chef d'arrondissement;
◆ J. E. **Lindblad**, directeur, membre de l'Adminis tion Royale;
◆ T. A. T. **Hård**, ingénieur en chef du Départem des Signaux;
◆ T. **Emers** (*), inspecteur en chef supérieur du S vice de l'Exploitation (reporter).

Chemin de fer de Bergslagen :

◆ A. **Akesson**, président;
◆ Y. **Simonsson**, chef de l'Exploitation.

Chemin de fer Blekinge-Kustbanor :

◆ S. **de Hagströmer**, président du Conseil d'ad nistration (Gouverneur de la province de Blekin
◆ Commandant S. **Holmgren**, directeur en chef.

Chemin de fer Borås-Herrljunga och Varb Borås :

H. **von Porat**, directeur en chef, ingénieur.

Chemin de fer Gefle-Dala :

◆ A. **Hjelmer**, chef du mouvement.

Chemin de fer Göteborg-Borås & Borås-Alfv

◆ C. **Petri**, gérant.

Chemin de fer Halmstad-Nässjö :

◆ O. **Wallenberg**, administrateur, capitaine;
A. **Wiman**, directeur en chef, major.

Chemin de fer Hä`singborg-Hessleholms :

◆ C. **Jönsson**, trafikchef.

Chemin de fer Kalmar-Nya :

H. **Lundqvist**, directeur en chef.

Chemin de fer privé Karlskrona-Växjö :

E. **Billvall**, directeur du mouvement.

Chemin de fer Nässjö-Oskarshamn :

Y. **Hjortzberg** (captain), general manager.

Chemin de fer Nora-Bergslagen :

H. **Malmquist**, directeur.

Chemin de fer Nordmarks-Klarelfvens :

. **Hagberg**, chef.

Chemin de fer Norra-Oestergötland :

. **Andersson**, directeur.

Chemin de fer Norsholm-Westervik-Hultsfred :

. **Westeson**, chef du Mouvement;
. W. **Lindgren**, directeur en chef.

Chemin de fer Oxelösund-Flen-Västmanlands :

. **Johnson**, general manager;
. O. **Johnson**, superintendent of Motive Power.

Chemin de fer Stockholm-Roslag :

. **Nerell**, general manager;
. **Lindholm**, locomotive and electrical super-
endent.

Chemin de fer Stockholm-Vesteras-Bergslagen :

. **Klemming**, directeur mécanicien;
. J. **Schmidt**, chef du Mouvement.

Chemin de fer Västergötland-Göteborg :

. **Söderling**, directeur;
ykander, directeur.

Suisse (Switzerland).

Chemins de fer Fédéraux :

. **Schrafl** (*), président de la Direction générale
mber of the Permanent Commission);
. **Etter**, membre de la Direction générale;
Labhardt, directeur du 2e arrondissement;
r. R. **Cottier** (*), directeur du 3e arrondissement
porter);
. **Acatos**, chef de la division de la Voie;
Matter, chef principal de l'Exploitation;
. **Müller**, chef de la division de la Traction et des
iers;
. **Eggenberger** (*), chef de la division de l'Elec-
cation (reporter);
r. F. **Hess**, secrétaire général.

Chemins de fer des Alpes bernoises (Berne-Loetschberg-Simplon) :

◆ F. **Volmar**, directeur;
◆ J. **Ammann**, chef du Service commercial.

Chemin de fer Rhétique :

◆ Dr. Ing. E. **Branger**, Direktor;
◆ Dipl. Ing. H. **Conrad**, Oberingenieur.

Chemin de fer de Viège à Zermatt :

◆ A. **Marguerat** (*), ingénieur, directeur de la Compagnie (member of the Permanent Commission).

Chemin de fer d'Yverdon à Sainte-Croix :

◆ Ed. **Jeanneret**, directeur.

Chemin de fer de Lausanne à Ouchy :

◆ V. **Dumur**, directeur.

Tchécoslovaquie (Czechoslovakia).

Chemins de fer de l'Etat :

◆ P. **Koller**, ingénieur, directeur des Services de la Traction et du Matériel;
◆ J. **Hondl** (*), directeur des Services du Personnel (delegated by the Government, and reporter);
◆ S. **Zavadil**, ingénieur, conseiller ministériel;
◆ A. **Svoboda** (*), ingénieur, conseiller technique (reporter);
◆ J. **Leiner**, ingénieur, commissaire ministériel principal;
◆ V. **Ibl**, ingénieur, directeur de l'Exploitation au Ministère des Chemins de fer.

Uruguay.

Central Uruguay Railway of Montevideo :

H. O. **Tubby**, secretary;
◆ F. C. **Pearson**, assistant general manager;
◆ R. V. **Cable**, chief accountant;
Miss Mary K. **Nicolson**, foreign correspondent;
◆ A. J. **Boyd**, engineer.

Yougoslavie (Jugoslavia).

Chemins de fer de l'Etat :

◆ Ing. M. **Yoyitch** (*), directeur général adjoint (member of the Permanent Commission);
◆ Ing. M. **Schneler**, directeur, direction régionale de Zagreb;
◆ Ing. A. **Popovitch**, directeur, direction régionale de Subotica;
◆ D. **Litchina**, directeur, direction régionale de Sarajevo;
◆ Ing. D. **Atanatzkovitch**, ingénieur en chef du service de l'Exploitation de la direction générale;
◆ Ing. F. **Finc**, ingénieur en chef du service des Machines, Ljubljana;
◆ Ing. V. **Stehlik**, conseiller supérieur au Ministère des Communications;
◆ Ing. R. **Radoulovitch**, conseiller supérieur à la direction générale;
◆ Ing. B. **Ribitch**, conseiller à la direction régionale de Zagreb.

C. — DELEGATES OF ORGANIZATIONS AFFILIATED TO THE INTERNATIONAL RAILWAY CONGRESS ASSOCIATION.

Compagnie auxiliaire internationale de Chemins de fer :

◆ V. **Caspers**, administrateur-délégué.

Compagnie Internationale des Wagons-Lits et des Grands Express Européens :

◆ R. **Margot-Noblemaire** (*), directeur général (member of the French Local Organizing Commission);
◆ P. **Loth**, directeur de l'Exploitation générale;
◆ F. **Woytt**, ingénieur en chef des services techniques;
◆ J. **Muntz**, ingénieur en chef des Etudes et des Constructions;
◆ **Bugniet** (*), directeur régional à Paris (member of the French Local Organizing Commission).

Comité permanent des Transports par voie ferrée de la Société des Nations :

◆ P. H. **Watier**, secrétaire général de l'Organisation des Communications et du Transit;
◆ J. L. **Metternich**, secrétaire du Comité permanent des Transports par voie ferrée, de l'Organisation des Communications et du Transit.

Federazione Nazionale Fascista degli Esercenti Imprese ferroviarie, tramviare e di Navigazione interna (Italy) :

◆ Gr. Cr. Ing. G. **Ottone** (*), président (member of the Permanent Commission);
◆ On. Cav. del Lavoro Ing. R. **Luzatti**, vice-président;
Gr. Uff. Prof. R. **Trevisani**;
◆ Comm. Ing. A. **Ferrario**;
◆ Comm. Avv. A. **Pavone**.

Mitteleuropäische Schlafwagen- und Speisewa gen-A. G. (Mitropa) :

◆ Dr. W. **Kieschke**, Generaldirektor;
◆ H. **Alten**, Direktor.

Railway Clearing House (Great Britain) :

E. E. **Painter**, secretary;
Lord **Mildway of Flete**, director, Great Weste Railway.

Union des voies ferrées et des transports aut mobiles (France) :

◆ A. **Lindecker**, administrateur-directeur de la S ciété Anonyme des Autobus Chaumontais; préside de l'Union V. F. T. A.;
◆ H. **Lauru**, directeur de la Compagnie Généra Française de Tramways, président du Comité d Tramways de l'Union;
◆ A. **Gallois**, administrateur-délégué de la Soci Versaillaise de Tramways Electriques et de Distrib tion d'énergie; vice-président du Comité des Tra ways de l'Union;
◆ L. **Jeancard**, président du Conseil d'Administrati et directeur de la Compagnie des Chemins de Economiques des Charentes; vice-président du C mité des Chemins de fer de l'Union;
◆ R. **Balensi**, administrateur-directeur des Chemi de fer de la Camargue.

Union Internationale des Chemins de fer (U.I.C

◆ A. **Mange** (*), président du comité de gérance; a ministrateur de la Compagnie du Chemin de fer Paris à Orléans (member of the Permanent Comm sion);
◆ G. **Leverve**, secrétaire général;
◆ G. **Pader**, secrétaire général-adjoint.

Union of Swedish Private Railways :

◆ G. **Löfmarck**, directeur en chef;
◆ P. **Kock**, directeur.

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320	**Alex, E.**	Chemins de fer Royaux de l'Etat (Hungary)	1, 4
85	**Allard, A.**	Société Nationale des Chemins de fer Vicinaux (Belgium)	5
782	**Alten, H.**	Mitteleuropäische Schlafwagen- und Speisewagen A. G. (Mitropa)	3, 4
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343	**Bello, M.**	Compagnie Nationale des Chemins de fer portugais	4, 5

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279	**Breynaert, F.**	Compagnie du Chemin de fer de Gafsa (Tunis)	2. 4. 5
298	**Brouillet, R.**	Compagnie Française des Chemins de fer de l'Indochine et du Yunnan	4, 5
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479	**Bruneau**	Chemins de fer du Midi (France)	4

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84	**Charlier**	Secretariat of the International Railway Congress Association	...
103	**Charlot**	Ministère des Travaux Publics (France)	...
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296	**Chenut, L.**	Chemin de fer de Damas-Hama et Prolongements	3, 4. 5
703	**Chevreau, F.**	Chemins de fer de l'Etat (France)	3
709	**Chrétien, R.**	Chemins de fer de l'Etat (France)	1
516	**Clay, W. H. C.**	London Midland and Scottish Railway	1, 2, 4
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291	**Collin, A.**	Compagnie Fermière des Chemins de fer tunisiens (Tunis)	3, 4, 5
371	**Conrad, H.**	Chemin de fer Rhétique (Switzerland)	3, 5
679	**Cooper, A.**	North Western Railway (India)	3, 4
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449	**Cope** (Sir Ralph)	Great Western Railway (Gr. Britain)	4
548	**Costa, M.**	Compagnie des Chemins de fer portugais.	1, 3, 4
297	**Coster, J.**	Chemin de fer de Damas-Hama et Prolongements	3, 4
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74	**de Boysson**	Chemin de fer de Paris à Orléans	1 to 5
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769	**De Droog**	Ministère des Transports (Belgium)	2, 4
537	**de Falco, M.**	Chemins de fer de la Méditerranée (Italy)	2, 3, 5
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728	**Delelienne, Ch.**	Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	2, 3, 4
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780	**Deshpande, H. B.**	East Indian Railway	...
686	**De Smedt, G.**	Société Nationale des Chemins de fer Vicinaux (Belgium)	5
785	**de Sousa, F. J.**	Chemins de fer de l'Etat dans les Colonies portugaises	3, 4, 5
18	**de Spirlet, A.**	Permanent Commission of the Association, Chemin de fer Nord-Belge and Chemin de fer de Chimay	1, 3, 4
811	**Desprets, R.**	Société Nationale des Chemins de fer belges (Belgium)	1
398	**de Tilly, R.**	Chemins de fer de Rosario à Puerto Belgrano (Argentine)	2, 3, 4
250	**Devoucoux, E.**	Chemins de fer de l'Est (France)	1, 3
267	**de Waru, M.**	Société Générale des Chemins de fer Economiques (France)	5
866	**Dodu**	Ministère des Travaux Publics (France).	...
399	**d'Ornellas, Ch.** (Baron)	Chemins de fer de Rosario à Puerto-Belgrano (Argentine)	1, 3, 4
19	**Dorpmüller, J.** (Dr. Ing. eh.)	Permanent Commission of the Association, German Ministry of Communications, and Deutsche Reichsbahn	1 to 5
481	**Dreyfus**	Chemins de fer du Midi (France)	3
332	**Driessen, Ch. H. J.**	Chemins de fer néerlandais (Netherlands)	1 to 3
744	**Drossopoulos, C.**	Compagnie des Chemins de fer de Thessalie (Greece)	3, 5
601	**D'Souza, F.**	Government of India, Railway Department	3, 4, 5
289	**du Bousquet, P.**	Chemin de fer Franco-Ethiopien de Djibouti à Addis-Abeba	3
81	**Dubus, J.**	Secretariat of the International Railway Congress Association	...
134	**Duchatel**	French Local Organizing Commission	...
816	**Duchatel**	Chemins de fer de Paris à Lyon et à la Méditerranée	4, 5
165	**Dugas**	Chemin de fer de Paris à Orléans	2, 4
160	**Dumas**	Chemin de fer du Nord (France)	4
599	**Dumont, M.**	Direction Générale des Travaux Publics (Grand Duchy of Luxemburg)	...
372	**Dumur, V.**	Chemin de fer de Lausanne à Ouchy	3, 5
631	**Duncan, R. H.**	Bengal Nagpur Railway	1 to 5

Number	NAME.	DELEGATED BY	SECTIONS.
125	**du Plessis d'Argentré**	Chemin de fer de Paris à Orléans	...
222	**Duquesne, M.**	Chemins de fer Vicinaux du Congo (Belgium)	3
800	**Edwards, H. E.**	Madras and Southern Mahratta Railway.	4
641	**Egan, E. M.**	North Western Railway (India)	3, 4
167	**Eggenberger, H.**	Chemins de fer fédéraux (Switzerland)	2
571	**Ejmont, M.**	Chemins de fer de l'Etat (Poland)	2, 3
156	**Ellson, G.**	Southern Railway (Gr. Britain)	...
819	**Emering**	Chemins de fer d'Alsace et de Lorraine	2
173	**Emers, T.**	Chemins de fer de l'Etat (Sweden)	3, 4
241	**Engqvist, I. F.**	Chemins de fer de l'Etat (Denmark)	1, 3, 4
593	**Ensor, E. L.**	Great Indian Peninsula Railway	3, 4, 5
492	**Epinay**	Chemin de fer de Paris à Orléans	3
361	**Etter, H.**	Chemins de fer fédéraux (Switzerland)	1, 2, 3
243	**Fabry, R.**	Chemins de fer de l'Est (France)	3. 4
169	**Fairburn, C. E.**	London Midland and Scottish Railway	2
748	**Falcone, G.** (Gr. Uff. Avv.)	Chemins de fer de l'Etat (Italy)	3, 4, 5
726	**Farenc**	Voies Ferrées des Landes (France)	...
853	**Farnè, F.**	Chemins de fer de l'Etat (Italy)	1
583	**Farquharson, J. R.**	Kenya and Uganda Railways	1, 5
735	**Fattori, G.** (Dott. Ing. Comm.)	Société Vénitienne pour la Construction et l'Exploitation de Chemins de fer secondaires (Italy)	3, 5
107	**Ferasson**	French Local Organizing Commission	...
828	**Ferrario, A.** (Com. Ing.)	Federazione Nazionale Fascista degli Esercenti Imprese Ferroviarie, Tramviarie e di Navigazione interna (Italy).	1 to 5
271	**Ferreaud, A.**	Société Générale des Chemins de fer Economiques (France)	5
797	**Ferreira, J. D.**	Chemins de fer du Benguela	2, 4, 5
549	**Ferreira, V.**	Compagnie des Chemins de fer portugais.	1, 3, 4
547	**Fezas Vital** (Dr. D.)	Compagnie des Chemins de fer portugais.	4, 5
756	**Fiachetti, M.** (Comm. Ing.).	Chemins de fer de l'Etat (Italy)	1, 3
505	**Fielden, E. B.**	London Midland and Scottish Railway	1, 2, 3
755	**Filippini, A.** (Comm. Dr.)	Chemins de fer de l'Etat (Italy)	4
764	**Finc, F.**	Chemins de fer de l'Etat (Jugoslavia)	2, 5
467	**Finnis, D. R.**	Taltal Railway (Chile)	2, 4
20	**Fiori, F.** (Gr. Uff. Ing.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Italy)	1, 2, 4
151	**Flament**	Chemin de fer du Nord (France)	1
536	**Flamini, F.**	Chemins de fer de la Méditerranée (Italy)	3, 4, 5
664	**Fontaine, A. M. J. J.**	Société Nationale des Chemins de fer belges (Belgium)	2
628	**Forbes, C. J.**	County Donegal Railways Joint Committee (Ireland)	...
627	**Forbes, H.**	County Donegal Railways Joint Committee (Ireland)	5
721	**Foss**	Chemins de fer de l'Etat (Norway)	4
556	**Francis, H.**	Central Argentine Railway	4, 5
615	**Franzen, F. W.**	Ministère de l'Intérieur (Sweden)	...
158	**Fraser, W. A.**	London and North Eastern Railway	1, 3
543	**Gallois, A.**	Union des Voies Ferrées et des Transports Automobiles (France)	2, 4, 5
857	**Gaudry**	French Local Organizing Commission	...
104	**Gerdès**	Ministère des Travaux Publics (France)	1

Number.	NAME.	DELEGATED BY	SECTIONS.
260	**Gerin**	Chemins de fer de Paris à Lyon et à la Méditerranée	1
390	**Getten, P.**	Chemin de fer du Nord français	3, 4
22	**Ghilain, P.**	Permanent Commission of the Association and Secretariat of the International Railway Congress Association	..
418	**Gibson, A. L.**	London and North Eastern Railway . .	3, 4
105	**Gilles-Cardin**	Ministère des Travaux Publics (France) .	..
219	**Gillet, P.**	Office d'Exploitation des Transports Coloniaux « Otraco », and Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	2, 3
171	**Gilmaire**	Chemin de fer de Paris à Orléans . . .	3
753	**Giovene, N.** (Gr. Uff. Ing.)	Chemins de fer de l'Etat (Italy) . . .	1, 2, 4
700	**Girette, J.**	Chemins de fer de l'Etat (France) . . .	2, 3, 4
566	**Glanville, O. H.**	Burma Railways	3
863	**Godin**	Ministère des Travaux Publics (France) .	...
635	**Gordon, R. E.** (Lt. Col.) .	North Western Railway (India) . . .	...
530	**Gosset, H. H. E.** (Lt. Col.).	Eastern Bengal Railway	1, 3, 4
682	**Götz, J. F. F.**	Chemins de fer de l'Etat (Dutch Indies).	3, 5
391	**Goursat, J.**	Chemin de fer du Nord (France) . . .	3, 4
559	**Gracey, T.** (Lt. Col.) . . .	Bengal and North Western Railway . .	1, 3, 4
681	**Graff-Baker, W. S.**, B. Sc.	London Passenger Transport Board . .	1
170	**Grandjean, A.**	Chemins de fer d'Alsace et de Lorraine .	3, 5
23	**Granholm, A. M.**	Permanent Commission of the Association and Ministère de l'Intérieur (Sweden) .	...
431	**Greathead, J. M.**	South African Railways and Harbours .	1, 5
680	**Greene, A. E.**	North Western Railway (India)	1
24	**Gresley** (Sir H. Nigel), C. B. E., Dr. Sc. . . .	Permanent Commission of the Association and London and North Eastern Railway	2, 3, 4
204	**Grey, N. F. E.**	Buenos Aires Great Southern Railway .	3, 4
636	**Griffith, F. G.**	North Western Railway (India) . . .	3, 4
268	**Grignon, J.**	Société Générale des Chemins de fer Economiques (France)	5
4	**Grimpret**	Permanent Commission of the Association and Ministère des Travaux Publics (France)	..
25	**Gufflet**	Permanent Commission of the Association and Chemins de fer du Midi (France) .	3, 4, 5
396	**Guillaume, E. J.**	Chemin de fer du Nord (France) . . .	1, 2
623	**Günther, K.**	Deutsche Reichsbahn	2
234	**Gysels, A.**	Société Nationale de Chemins de fer en Colombie	2
261	**Hachon**	Chemins de fer de Paris à Lyon et à la Méditerranée	1
214	**Haerens, R.**	Railways Economiques de Liége-Seraing et Extensions (Belgium)	4, 5
546	**Hagberg, T.**	Chemin de fer Nordmarks-Klarelfvens (Sweden)	3, 5
446	**Hambro, C. J.**, M. C. . .	Great Western Railway (Gr. Britain) . .	1 to 5
625	**Hamel, H.**	Deutsche Reichsbahn	...
581	**Hamp, A. E.**	Kenya and Uganda Railway	1, 4, 5
237	**Hansen, P.**	Chemin de fer de la Fionie Méridionale (Denmark)	3, 4, 5

Number.	NAME.	DELEGATED BY	SECTIONS.
441	**Hard, T. A. T.**	Chemins de fer de l'Etat (Sweden)	1, 3
851	**Harper**	London Midland and Scottish Railway	...
723	**Harris, F.**	Ministère des Chemins de fer (China)	...
507	**Hartley** (Sir Harold)	London Midland and Scottish Railway	1, 2, 3, 4
27	**Harvey, R. J.**	Permanent Commission of the Association and New Zealand Government Railways	1 to 5
152	**Hashiguchi, Y.**	Japanese Government Railways	1, 3, 5
803	**Hassa, A.**	Chemins de fer fédéraux (Austria)	2, 3
702	**Hauterre, E.**	Chemins de fer de l'Etat (France)	3, 4
620	**Hayashi, S.**	Japanese Government Railways	2, 4
693	**Hayderi, N.**	Iraq Railways	2, 3 4
706	**Hébert, Fr.**	Chemins de fer de l'Etat (France)	2, 3, 4
624	**Hein, Dr. G.**	Deutsche Reichsbahn	4
836	**Henriksen, K.**	Chemins de fer de l'Etat (Norway)	...
28	**Henry-Gréard**	Permanent Commission of the Association and Chemin de fer de Paris à Orléans	1 to 5
240	**Herschend, W.**	Chemins de fer de l'Etat (Denmark)	3, 4
367	**Hess, Dr. F.**	Chemins de fer fédéraux (Switzerland)	4
589	**Heysham, E. H. B.**	East Indian Railway	3, 4
683	**Heyting, J. J.**	Chemins de fer de l'Etat (Dutch Indies)	1
649	**Hiki, H.**	Japanese Government Railways	1, 5
315	**Hill, R. L.**	Sudan Railways	3, 5
348	**Hjelmer, A.**	Chemin de fer Gefle-Dala (Sweden)	2, 3
354	**Hjortzberg, Y.**	Chemin de fer Nässjö-Oskarshamm (Sweden)	1, 2
554	**Holland, W. C.**	Central Argentine Railway	3, 4
715	**Holma, H.**	Finnish Government	...
347	**Holmgren, S.**	Chemin de fer Blekinge-Kustbanor (Sweden)	1
187	**Hondl, J.**	Chemins de fer de l'Etat (Czechoslovakia)	4
606	**Horikoshi, I.**	Japanese Government Railways	1, 5
746	**Hoskiaer, F.**	Ministère des Travaux Publics (Denmark)	4
522	**Hossack, J.**	Burma Railways	1
308	**Howden, G. B.**	Great Northern Railway (Ireland)	1, 2, 3
640	**Huggins, H. W.**	North Western Railway (India)	2
331	**Hupkes, W.**	Chemins de fer néerlandais (Netherlands)	2, 3
30	**Hurcomb** (Sir Cyril), K. B. E., C. B.	Permanent Commission of the Association and Ministry of Transport (Gr. Britain)	...
833	**Ibl, Vl.**	Chemins de fer de l'Etat (Czechoslovakia)	...
671	**Ilmoniemi, L.**	Chemins de fer de l'Etat (Finland)	1
724	**Ithier, G.**	Compagnie Générale d'Entreprises électriques et industrielles « Electrobel » (Belgium)	...
59	**Iwamura, M.**	Permanent Commission of the Association and Japanese Government Railways	1, 4
31	**Jacobs, L.**	Permanent Commission of the Association and Société Nationale des Chemins de fer Vicinaux (Belgium)	5
749	**Jacometti, J.** (Gr. Uff. Ing.)	Chemins de fer de l'Etat (Italy)	1, 2, 3
791	**Jacquet**	Ministère des Travaux Publics (France)	3, 4
795	**Jacquinot**	Chemins de fer coloniaux de l'Afrique occidentale française et Togo	...

Number.	NAME.	DELEGATED BY	SECTIONS.
226	**Jadot, O.**	Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	1, 2
806	**Jannelli, M.** (H. E. On. Avv.)	Ministère des Communications (Italy)	...
669	**Jansson, V.**	Chemins de fer de l'Etat (Finland)	1, 3, 4
256	**Japiot**	Chemins de fer de Paris à Lyon et à la Méditerranée	2, 4
792	**Jarrigion**	Ministère des Travaux Publics (France)	...
544	**Jeancard, L.**	Union des Voies Ferrées et des Transports Automobiles (France)	2, 3, 5
737	**Jeanneret, Ed.**	Chemin de fer d'Yverdon à Sainte-Croix (Switzerland)	...
468	**Jensen-Stevns, P. J.**	Chemin de fer de l'Est de Seeland (Denmark)	3, 4
33	**Jezierski, H.**	Permanent Commission of the Association and Ministère des Communications (Poland)	1
356	**Johnson, H. O.**	Chemin de fer Oxelösund-Flen-Västmanlands (Sweden)	1, 2
355	**Johnson, J.**	Chemin de fer Oxelösund-Flen-Västmanlands (Sweden)	1, 4
731	**Joly, E. A.**	Chemin de fer Métropolitain de Paris	1, 2, 3
352	**Jönsson, C.**	Chemin de fer Helsingborg-Hessleholm (Sweden)	1, 2, 3
557	**Jordan, F.**	Chemin de fer privé d'Aalborg (Denmark)	4
582	**Jouanno, Ch. A. G.**	Kenya and Uganda Railways	2
282	**Jouaville**	Chemins de fer Algériens (Gestion Commune)	3, 4
264	**Joubert, J.**	Société Générale des Chemins de fer Economiques (France)	5
285	**Jourdain, A.**	Chemins de fer Algériens (Gestion Commune)	1 to 5
121	**Jourdain, P.**	Chemins de fer secondaires du Nord-Est (France)	...
168	**Kaan, E.**	Chemins de fer fédéraux (Austria)	1, 2, 4
387	**Kamal el Khishin Bey**	Egyptian Government and Egyptian State Railways	1
672	**Karasjoki, Y.**	Chemins de fer de l'Etat (Finland)	2
572	**Karlsbad, A.**	Chemins de fer de l'Etat (Poland)	2, 3
455	**Kay, J. A.**	Great Western Railway (Gr. Britain)	1 to 5
386	**Khalil Fahmy Hussein Bey.**	Egyptian Government and Egyptian State Railways	3, 4, 5
781	**Kieschke** (Dr. W.)	Mitteleuropäische Schlafwagen- und Speisewagen A. G. (Mitropa)	3, 4
26	**Kirkness, L. H.**	Permanent Commission of the Association	3, 4
227	**Kirsch, E.**	Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	2, 3
35	**Kittel, Th.** (Dr. Jur.)	Permanent Commission of the Association and Deutsche Reichsbahn	2
695	**Klemming, S.**	Chemin de fer Stockholm-Vesteras-Bergslagen (Sweden)	2
36	**Knutzen, P.**	Permanent Commission of the Association and Ministère des Travaux Publics (Denmark)	2, 4

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385	**Kock, P.**	Union des Chemins de fer privés (Sweden)	3, 4
373	**Koller, P.**	Chemins de fer de l'Etat (Czechoslovakia)	2
837	**Kosuge, S.**	South Manchuria Railway	...
29	**Kradolfer, P.**	Permanent Commission of the Association and Office Fédéral des Transports (Switzerland)	1, 3, 4, 5
573	**Krzyzanowski, A.**	Chemins de fer de l'Etat (Poland)	3, 4
411	**Labbé, G.**	Chemins de fer du Port et de la Pointe des Galets (Reunion Island)	1, 5
362	**Labhardt, E.**	Chemins de fer fédéraux (Switzerland)	1, 3
129	**Lafaye**	French Local Organizing Commission	...
821	**Lagarde**	Chemins de fer coloniaux de l'Afrique occidentale française et Togo	...
393	**Lamarque, A.**	Chemin de fer du Nord (France)	3, 4
520	**Lamb, D. R.**	London Midland and Scottish Railway	2, 3, 4
634	**Lambe, T. T.**	East Indian Railway	2, 3, 5
392	**Lancrenon, P.**	Chemin de fer du Nord (France)	2, 3, 4
651	**Landsberg, C.**	Chemins de fer de l'Etat (Poland)	3, 4
473	**Lang, H.**	Chemins de fer d'Alsace et de Lorraine	1, 4
251	**Lanos, G.**	Chemins de fer de l'Est (France)	1, 3
558	**Larsen, J. A.**	Chemin de fer privé d'Aalborg (Denmark)	4
394	**Latrasse, A.**	Chemin de fer du Nord (France)	3, 5
602	**Laughton, G. C.**	Government of India, Railway Department	1, 5
687	**Laurent, F.**	Société Nationale des Chemins de fer Vicinaux (Belgium)	5
111	**Laurent, R.**	French Local Organizing Commission	...
542	**Lauru, H.**	Union des Voies Ferrées et des Transports Automobiles (France)	2, 4, 5
3	**Le Besnerais**	Permanent Commission of the Association and Chemin de fer du Nord (France)	1 to 5
477	**Leclerc du Sablon**	Chemins de fer du Midi (France)	1 to 5
283	**Lecoanet**	Chemins de fer Algériens (Gestion Commune)	1
247	**Legoux, G.**	Chemins de fer de l'Est (France)	3, 4
133	**Legrand**	French Local Organizing Commission	2
621	**Leibbrand** (Dr. Ing. eh. Max.)	Deutsche Reichsbahn	2, 3
376	**Leiner, J.**	Chemins de fer de l'Etat (Czechoslovakia)	2
37	**Lemaire, C.**	Permanent Commission of the Association and Société Nationale des Chemins de fer belges (Belgium)	1
659	**Letelier-Espinola, M.**	Chilean Government	...
456	**Level, F.**	Compagnie Générale des Voies Ferrées d'intérêt local (France)	3, 4, 5
382	**Leverve, G.**	Union Internationale des Chemins de fer.	1, 3, 4
708	**Lévi, R.**	Chemins de fer de l'Etat (France)	1
395	**Lévy, A.**	Chemin de fer du Nord (France)	3, 4
161	**Lévy, J.**	Chemins de fer de l'Etat (France)	2, 3, 4
699	**Lévy, P.**	Chemins de fer de l'Etat (France)	1, 3, 4
220	**Liénart, A.**	Chemins de fer Vicinaux (Belgian Congo)	4, 5
440	**Lindblad, J. E.**	Chemins de fer de l'Etat (Sweden)	3, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
541	**Lindecker, A.**	Union des Voies Ferrées et des Transports Automobiles (France)	3, 4
358	**Lindholm, J.**	Chemin de fer Stockholm-Roslag (Sweden)	2, 5
762	**Litchina, D.**	Chemins de fer de l'Etat (Jugoslavia)	4, 5
188	**Lo Balbo, P.**	Compagnie Générale des Tramways Piémontais (Italy)	3, 4, 5
384	**Löfmarck, G.**	Union des Chemins de fer privés (Sweden)	3, 4
276	**Loiseau, G.**	Régie Départementale des Tramways de l'Ain (France)	3, 5
377	**Loth, P.**	Compagnie Internationale des Wagons-Lits et des Grands Express Européens.	2, 3, 4
534	**Lowther, E. H. N.**	East Indian Railway	3, 4
425	**Lundqvist, H.**	Chemin de fer Kalmar-Nya (Sweden)	2, 3
447	**Luttrell, G. F.**, J. P.	Great Western Railway (Gr. Britain)	1 to 5
319	**Lux, E.**	Chemins de fer royaux de l'Etat (Hungary)	2, 3
535	**Luzzati, R.**	Chemins de fer de la Méditerranée (Italy)	1, 2, 3
533	**Macauley, D.**	Eastern Bengal Railway	2, 4
311	**Mackenzie-Brown, W. H.**	Sudan Railways	1, 5
322	**Mac Mahon** (Rt. Hon. James), P. C.	Great Southern Railways (Ireland)	1, 3, 4
796	**Malacam**	Chemins de fer Coloniaux de l'Indochine	...
277	**Malgoire, F.**	Régie Départementale des Tramways de l'Ain (France)	3, 5
426	**Malmquist, H.**	Chemin de fer Nora-Bergslagen (Sweden)	3, 5
39	**Mange, A.**	Permanent Commission of the Association and Union Internationale des Chemins de fer	2, 3, 4
815	**Mange, M.**	Chemins de fer de Paris à Lyon et à la Méditerranée	3
598	**Marchbank, J.**	Ministry of Transport (Gr. Britain)	...
843	**Margot, M.**	Chemins de fer du Maroc	4
123	**Margot-Noblemaire, R.**	Compagnie Internationale des Wagons-Lits et des Grands Express Européens.	2, 3, 4
40	**Marguerat, A.**	Permanent Commission of the Association and Chemin de fer de Viège à Zermatt (Switzerland)	4, 5
122	**Mariage**	French Local Organizing Commission	...
274	**Mariolle, P.**	Chemins de fer secondaires du Nord-Est (France)	...
496	**Martin**	Chemin de fer de Paris à Orléans	4
76	**Martin, P.**	Chemin de fer Métropolitain de Paris	3, 4, 5
77	**Martinet**	Chemins de fer de Paris à Lyon et à la Méditerranée	1 to 5
166	**Mascini, A.** (Comm. Ing.)	Chemins de fer de l'Etat (Italy)	1, 2, 3
293	**Masseron, J.**	Compagnie Fermière des Chemins de fer tunisiens (Tunis)	1
504	**Masson, R.**	Compagnie Générale des Chemins de fer Vicinaux (France)	5
364	**Matter, E.**	Chemins de fer fédéraux (Switzerland)	3
403	**Mayer, R. J. S.**	Chemin de fer Nord-Belge (Belgium)	3, 4
451	**Maynard, A.**	Great Western Railway (Gr. Britain)	2, 3, 4
521	**McAllister, N.**	Burma Railways	1
327	**McDonald, J. J.**	Great Southern Railways (Ireland)	4

Number.	NAME.	DELEGATED BY	SECTIONS.
639	**Meldrum, M.**	North Western Railway (India)	3, 4
718	**Melissinos, C.**	Chemins de fer de l'Etat (Greece)	1, 3, 4
184	**Mellini, E.**	Chemins de fer de l'Etat (Italy)	2, 3, 4
300	**Mermilliod, R.**	Compagnie Française des Chemins de fer de l'Indochine et du Yunnan	1, 3
698	**Metternich, J. L.**	League of Nations (Permanent Committee on Transportation)	1 to 5
448	**Milne, J.** (Sir), K. C. V. O., C. S. I.	Great Western Railway (Great Britain)	1 to 5
804	**Minoda, F.**	Japanese Government	...
181	**Minucciani, G.** (Comm. Ing.)	Chemins de fer de l'Etat (Italy)	1, 2, 3
179	**Miszke, A.** (Prof. Ing.)	Chemins de fer de l'Etat (Poland)	3
714	**Mohiuddin, M. K.**	Great Indian Peninsula Railway	3, 4
684	**Moltmaker, P.**	Ministère du Waterstaat (Netherlands)	...
610	**Monteiro, R.**	Ministère du Commerce et des Communications (Portugal)	...
476	**Moreau-Néret**	Chemins de fer du Midi (France)	1 to 5
788	**Moroni**	Ministère des Travaux Publics (France)	...
435	**Morris, P.**	Madras and Southern Mahratta Railway.	2
630	**Morrison, A.**	Bengal-Nagpur Railway	1, 5
326	**Morton, W. H.**	Great Southern Railways (Ireland)	1, 2, 4
596	**Motta, M.**	Società Trazione Elettrica Lombarda (Italy)	2, 3, 4
597	**Mount, A. H. L.** (Lt. Col.), C. B., C. B. E.	Ministry of Transport (Great Britain)	...
45	**Mugniot**	Permanent Commission of the Association and Chemins de fer de Paris à Lyon et à la Méditerranée	1 to 5
154	**Müller, O.** (Dr. Ing.)	Deutsche Reichsbahn	1
365	**Müller, W.**	Chemins de fer fédéraux (Switzerland)	2
501	**Mullet, G.**	Chemins de fer Economiques du Nord (France)	5
239	**Munck, O. H.**	Chemins de fer de l'Etat (Denmark)	2 and 3
159	**Mundt, Th. W.**	Chemins de fer néerlandais (Netherlands)	1
379	**Muntz, J.**	Compagnie Internationale de Wagons-Lits et des Grands Express Européens.	2, 3, 4
323	**Murphy, J. X.**	Great Southern Railways (Ireland)	1, 2, 4
555	**Myatt, E.**	Central Argentine Railway	2, 3, 4
770	**Naisby, J. R.**	South African Railways and Harbours	...
725	**Naudy**	Voies Ferrées des Landes (France)	...
357	**Nerell, A.**	Chemin de fer Stockholm-Roslag (Sweden)	1, 3, 4
416	**Newton, Ch. H.**	London and North Eastern Railway	3, 4
707	**Nicolet, V.**	Chemins de fer de l'Etat (France)	2, 3, 4
236	**Nielsen, C.**	Chemins de fer de la Fionie Méridionale (Denmark)	1, 2, 5
772	**Niu, H. H.**	Chemin de fer du Lunghai (China)	...
832	**Nossek, B.**	Ministère des Chemins de fer (Czechoslovakia)	...
574	**Ogurek, O.**	Chemins de fer de l'Etat (Poland)	2, 4
660	**Olivier, G. R. C.**	Société Nationale des Chemins de fer belges (Belgium)	1
217	**Olsen, F. W.** (General)	Office d'Exploitation des Transports Coloniaux « Otraco » (Belgian Congo)	3, 5
225	**Olyff, G.**	Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	4, 5

Number.	NAME.	DELEGATED BY	SECTIONS.
678	**Opheim, O. E.**	Chemins de fer de l'Etat (Norway)	4, 5
824	**Op 't Einde**	Société Nationale des Chemins de fer belges (Belgium)	2
831	**Ortmans, J.**	Société Nationale des Chemins de fer en Colombie	1 to 5
626	**Otto** (Fraülein **Liselotte**)	Deutsche Reichsbahn	...
48	**Ottone, G.** (Gr. Uff. Ing.)	Permanent Commission of the Association and Federazione Nazionale fascista degli Esercenti Imprese Ferroviarie, Tramviarie e di Navigazione (Italy)	1 to 5
840	**Ozawa, T.**	South Manchuria Railway	...
383	**Pader, G.**	Union Internationale des Chemins de fer.	3, 4, 5
172	**Palmieri, G. C.** (Comm. Ing.)	Chemins de fer de l'Etat (Italy)	1, 2, 3
339	**Panaitopol, G.**	Chemins de fer de l'Etat (Rumania)	2, 3, 4
329	**Papalexandrou, G.**	Chemins de fer du Pirée-Athènes-Péloponèse (Greece)	3, 4, 5
896	**Parisi, E.**	Société Nationale de Chemins de fer et de Tramways (Italy)	...
667	**Park, E. J.**	South African Railways and Harbours	...
164	**Parmantier**	Chemins de fer de Paris à Lyon et à la Méditerranée	2
135	**Parodi**	French Local Organizing Commission	...
822	**Pascal**	Chemins de fer de l'Afrique équatoriale française et Cameroun	...
275	**Pauzat, J.**	Chemin de fer de Somain à Anzin et à la Frontière belge (France)	1, 2, 3
829	**Pavone, A.** (Com. Avv.)	Federazione Nazionale Fascista degli Esercenti Imprese Ferroviarie, Tramviarie e di Navigazione interna (Italy).	1 to 5
653	**Pearson, F. C.**	Central Uruguay Railway of Montevideo.	2, 3, 4
49	**Pellarin, E.**	Permanent Commission of the Association and Chemins de fer de l'Est (France)	1, 3, 4
807	**Pennavaria, F.** (On. Avv.)	Ministère des Communications (Italy)	...
689	**Perdieus, Cl.**	Société Nationale des Chemins de fer Vicinaux (Belgium)	5
349	**Petri, C.**	Chemins de fer Göteborg-Boras & Boras-Alfvesta (Sweden)	3, 4
745	**Petsalis, D.**	Compagnie des Chemins de fer de Thessalie (Greece)	1, 3, 5
292	**Pezet, G.**	Compagnie Fermière des Chemins de fer tunisiens (Tunis)	2, 3, 4
773	**Philipoff, G.**	Chemins de fer de l'Etat (Bulgaria)	2
553	**Pinto Teixeira, F.** (Major)	Chemins de fer de l'Etat dans les Colonies portugaises et Ports et Chemins de fer du Mozambique	3, 4, 5
734	**Poli, D.** (Prof. Gr. Uff.)	Société Vénitienne pour la Construction et l'Exploitation de Chemins de fer secondaires (Italy)	3, 4, 5
131	**Pomaret**	French Local Organizing Commission	...
246	**Poncet, M.**	Chemins de fer de l'Est (France)	2, 3
812	**Ponticelli, E.** (Gr. Uff., Ing.)	Chemins de fer de l'Etat (Italy)	1, 2, 3
761	**Popovitch, A.**	Chemins de fer de l'Etat (Jugoslavia)	2, 3
78	**Porchez, A.**	Chemins de fer de l'Etat (France)	1
452	**Potter, F. R.**	Great Western Railway (Great Britain)	1 to 5

Number.	NAME.	DELEGATED BY	SECTIONS.
668	**Prem, N.**	North Western Railway (India)	3, 4
779	**Prinz, M.**	Ministère du Commerce et des Transports (Austria)	...
864	**Prot, M.**	Ministère des Travaux Publics (France)	...
860	**Raby**	Ministère des Travaux Publics (France)	...
766	**Radoulovitch, R.**	Chemins de fer de l'Etat (Jugoslavia)	1, 3
609	**Ramalho, R. V.**	Ministère du Commerce et des Communications (Portugal)	...
52	**Rauscher, Dr. W.**	Permanent Commission of the Association and Chemins de fer fédéraux (Austria).	3, 4, 5
472	**Regnaud, Ch.**	Chemins de fer d'Alsace et de Lorraine	2, 4
130	**Régnier, M.**	French Local Organizing Commission	...
244	**Renard, R.**	Chemins de fer de l'Est (France)	3, 4
286	**Renevey**	Chemins de fer Algériens (Gestion commune)	1 to 5
665	**Renier**	Société Nationale des Chemins de fer belges (Belgium)	1
799	**Requilé, M.**	Compagnie Générale des Tramways Piémontais (Italy)	...
861	**Reufflet**	Ministère des Travaux Publics (France)	...
500	**Rey, L. Ch. J.**	Chemins de fer du Cambrésis (France)	5
823	**Reydellet**	Chemins de fer de Madagascar	...
767	**Ribitch, B.**	Chemins de fer de l'Etat (Jugoslavia)	2, 3
132	**Riboud**	French Local Organizing Commission	...
102	**Riboulet**	French Local Organizing Commission	...
859	**Richard**	Ministère des Travaux Publics (France)	...
489	**Richemond**	Chemin de fer de Paris à Orléans	1 to 5
155	**Ridet, J.**	Chemins de fer de l'Est (France)	1, 3
789	**Robert**	Ministère des Travaux Publics (France)	...
510	**Roberts, O. G.**	London Midland and Scottish Railway	3, 4
312	**Robertson, R. H.**	Sudan Railways	1, 5
5	**Rockley** (The Right Hon. Lord), P. C., G. B. E.	Permanent Commission of the Association and Southern Railway (Gr. Britain)	...
460	**Roudy, A.**	Chemins de fer de la Province de Santa Fé (Argentine)	4
288	**Rousset, M.**	Chemin de fer Franco-Ethiopien de Djibouti à Addis-Abeba	2
551	**Ruas, A.**	Compagnie des Chemins de fer portugais.	1, 4
1	**Rulot, N.**	Permanent Commission of the Association and Société Nationale des Chemins de fer belges (Belgium)	...
421	**Rutter, E. M.**	London and North Eastern Railway	2, 3, 4
388	**Sakr, Mohamed** (Effendi)	Egyptian Government and Egyption State Railways	2
752	**Salvini, F.** (Comm. Ing.)	Chemins de fer de l'Etat (Italy)	1, 2, 3
809	**Salvini, G.**	Ministère des Communications (Italy)	...
409	**Sandberg, C. P.**, C. B. E.	Lunghai Railways and Chinese Government	1, 2, 3
814	**Santini**	Chemins de fer de Paris à Lyon et à la Méditerranée	2
648	**Satch, S.**	Japanese Government Railways	1, 5
8	**Sauer, K.**	Permanent Commission of the Association and Deutsche Reichsbahn	2, 5
696	**Schmidt, C. J.**	Chemin de fer Stockholm-Vesteras-Bergslagen (Sweden)	3, 4
760	**Schneler, M.**	Chemins de fer de l'Etat (Jugoslavia)	1, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
401	**Schöpfer, A.**	Chemins de fer fédéraux (Austria)	2, 3, 4
53	**Schrafl, A.**	Permanent Commission of the Association and Chemins de fer fédéraux (Switzerland)	1, 4
716	**Schramm, G.** (Dr. Ing.)	Deutsche Reichsbahn	1
818	**Schutz**	Chemins de fer d'Alsace et de Lorraine	1
742	**Schütz, Marta**	Deutsche Reichsbahn	...
108	**Schwob**	French Local Organizing Commission	...
642	**Scruby, J.**	North Western Railway (India)	1, 4
420	**Selway, J.,** C. B. E.	London and North Eastern Railway	3, 4, 5
422	**Sewell, A. E.**	London and North Eastern Railway	1, 3, 4
54	**Sgoureff, G.**	Permanent Commission of the Association and Chemins de fer de l'Etat (Bulgaria)	...
318	**Shaw, W. A.**	Ceylon Government Railway	1, 4, 5
526	**Shelley, A. D. G.** (Major)	Bombay, Baroda and Central India Railway	3, 4
423	**Sherrington, C. E. R.,** M. C., M. A.	London and North Eastern Railway	1, 3, 4
532	**Silvester, C. N.**	Eastern Bengal Railway	2, 4
345	**Simonsson, Y.**	Chemin de fer de Bergslagen (Sweden)	...
359	**Söderling, G.**	Chemin de fer de Västergotland-Göteborg (Sweden)	3, 5
717	**Sommer, G.** (Dr. Ing.)	Deutsche Reichsbahn	4, 5
330	**Sorel, A.**	Chemins de fer et Minières Prince-Henri (Grand Duchy of Luxemburg)	2, 3, 4
228	**Sorel, P.**	Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	3, 4
704	**Soulard, R.**	Chemins de fer de l'Etat (France)	3, 4
540	**Spach, Ch.**	Chemins de fer Guillaume-Luxembourg	3, 4
778	**Speir, K. R. N.**	London Midland and Scottish Railway	3, 4
514	**Stanier, W. A.**	London Midland and Scottish Railway	2
765	**Stehlik, V.**	Chemins de fer de l'Etat (Jugoslavia)	1, 5
307	**Stephens, J. B.**	Great Northern Railway (Ireland)	2, 3, 4
400	**Stockinger, F.**	Chemins de fer fédéraux (Austria)	3, 4
340	**Stoïka, V.**	Chemins de fer de l'Etat (Rumania)	1, 5
722	**Storsand, O.**	Ministère des Travaux Publics (Norway).	2
87	**Strauss**	Secretariat of the International Railway Congress Association	...
162	**Stroebe, H.**	Deutsche Reichsbahn	2
720	**Stymphaliades, A.**	Chemins de fer de l'Etat (Greece)	1
56	**Surleau, F.**	Permanent Commission of the Association and Chemins de fer d'Alsace et de Lorraine	1, 3, 4
838	**Suzuta, S.**	South Manchuria Railway	...
192	**Svoboda, A.**	Chemins de fer de l'Etat (Czechoslovakia)	1, 3, 5
57	**Swallow, T. C.**	Permanent Commission of the Association and South African Railways and Harbours	1, 2
518	**Symes, S. J.**	London Midland and Scottish Railways	2, 3
302	**Szlumper, G. S.**	Southern Railway (Great Britain)	...
810	**Tajani, F.** (Prof. Ing.)	Ministère des Communications (Italy)	...
442	**Tanabe, T.**	Government General of Chosen, Railway Bureau	1, 2, 3
647	**Tanaka, F.**	Japanese Government Railways	2, 5
195	**Targonski**	Chemins de fer de l'Etat (Poland)	4

Number.	NAME.	DELEGATED BY	SECTIONS.
729	**Tartary, G.**	Compagnie des Tramways Départementaux des Deux-Sèvres (France)	4, 5
238	**Terkelsen, E. D.**	Chemins de fer de l'Etat (Denmark)	3, 4
83	**Teugels, V.**	Secretariat of the International Railway Congress Association	...
618	**Thomann, E.**	Office Fédéral des Transports (Switzerland)	1 to 5
801	**Thomas, D. O.**	Madras and Southern Mahratta Railway (India)	4
509	**Thornhill, H. L.**	London Midland and Scottish Railway	4
787	**Tissier**	Ministère des Travaux Publics (France).	...
694	**Toma, J.**	Iraq Railways	1, 4, 5
798	**Torrès, C. M.**	Chemins de fer du Benguela	3, 4, 5
191	**Tosti, L.** (Comm. Ing.)	Chemins de fer de l'Etat (Italy)	3, 4, 5
194	**Trierenberg, K.** (Dr. Jur.)	Deutsche Reichsbahn	4
835	**Tritton, J. S.**	Bombay, Baroda and Central India Railway	2, 3, 5
432	**Troskie, P. D.**	South African Railways and Harbours	3, 4
646	**Tsubota, O.**	Japanese Government Railways	3, 5
177	**Tuja**	Chemins de fer de Paris à Lyon et à la Méditerranée	3
575	**Tuz, A.**	Chemins de fer de l'Etat (Poland)	3, 4
688	**Valcke, E.**	Société Nationale des Chemins de fer Vicinaux (Belgium)	5
439	**Valentin, J. A.**	Chemins de fer de l'Etat (Sweden)	1, 3
666	**Van der Borght**	Société Nationale des Chemins de fer belges (Belgium)	3
88	**Vandevliet**	Secretariat of the International Railway Congress Association	...
61	**van Manen, Dr. H.**	Permanent Commission of the Association and Chemins de fer néerlandais (Netherlands)	3, 4
61	**van Marle, Th., M. B.**	Permanent Commission of the Association and Ministère du Waterstaat (Netherlands)	3, 4
727	**Van Mulders, M.**	Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	1, 5
193	**Van Noorbeeck, E.**	Société Nationale des Chemins de fer Vicinaux (Belgium)	5
333	**van Rijckevorsel, W. F. H.**	Chemins de fer néerlandais (Netherlands)	3, 4
82	**Van Rijn**	Secretariat of the International Railway Congress Association	...
334	**Van Schouwenburg, W. H.**	Société des Chemins de fer aux Indes néerlandaises (Dutch Indies)	1, 2
786	**Vasconcelos Porto, A.G. (de)**	Chemins de fer de l'Etat dans les Colonies portugaises	2, 3, 4
747	**Vejre, C.**	Ministère des Travaux Publics (Denmark)	3, 4
63	**Velani, L.** (Cav. di Gr. Ing.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Italy)	1, 2, 3
86	**Velleman**	Secretariat of the International Railway Congress Association	...
397	**Verstraete, G.**	Chemin de fer de Rosario à Puerto Belgrano (Argentine)	1, 3, 4
458	**Verwilghen, H.**	Chemin de fer Malines-Terneuzen (Belgium)	4

Number.	NAME.	DELEGATED BY	SECTIONS.
6	**Vickers, D.**	Permanent Commission of the Association and London Midland and Scottish Railway	1, 2, 4
79	**Vignau**	French Local Organizing Commission	...
483	**Villeneuve**	Chemins de fer du Midi (France)	2
273	**Vincent, R.**	Chemins de fer secondaires du Nord-Est (France)	...
719	**Vlangalis, A.**	Chemins de fer de l'Etat (Greece)	2, 3
368	**Volmar, F.**	Chemins de fer des Alpes bernoises (Switzerland)	2, 4
576	**Wagner, J.**	Chemins de fer de l'Etat (Poland)	2, 3
301	**Walker** (Sir Herbert), K. C. B.	Southern Railway (Great Britain)	...
434	**Walker, M. A.**	Madras and Southern Mahratta Railway (India)	2
515	**Wallace, W. K.**	London Midland and Scottish Railway	1
350	**Wallenberg, O.**	Chemin de fer Halmstad-Nässjö (Sweden)	1, 2, 5
817	**Walter**	Chemins de fer de l'Etat (France)	...
65	**Wang, Ching-Chun, Ph. D.,** (Ll. D.)	Permanent Commission of the Association, Lunghai Railways and Chinese Government	3, 4
577	**Wasilewski, S.**	Chemins de fer de l'Etat (Poland)	2, 4
578	**Wasiutynski, A.** (Prof. Dr.)	Chemins de fer de l'Etat (Poland)	1, 4
429	**Watermeyer, T. H.**	South African Railways and Harbours	1 to 5
697	**Watier, P. H.**	League of Nations. Permanent Committee on Transportation	1 to 5
424	**Watson, H. A.** (C. B. E.)	London and North Eastern Railways	3, 5
622	**Wechmann, W.** (Prof. Dr. Ing. eh.)	Deutsche Reichsbahn	2
66	**Wedgwood** (Sir Ralph), C. B., C. M. G.	Permanent Commission of the Association and London and North Eastern Railway	2, 3, 4
454	**Weil-Rabaud**	Ministère des Travaux Publics (France)	...
410	**White, H. R.**	Bessemer and Lake Erie Railroad (U. S. A.)	1, 2, 4
848	**Whiteside, J. W.**	London Midland and Scottish Railway	...
841	**Wieloch, G.**	Deutsche Reichsbahn	...
215	**Wiener, L.**	Compagnie belge de Chemins de fer et d'Entreprises (Belgium)	3, 4, 5
313	**Williams, C. R.**	Sudan Railways	2, 5
673	**Williams, W. C.**	Buenos Aires Western Railway	2, 3, 4
560	**Williamson** (Sir James)	Bengal and North Western Railway	2, 3, 4
316	**Willoughby, J. L.**	Sudan Railways	3, 5
351	**Wiman, A.**	Chemin de fer Halmstad-Nässjö (Sweden)	1, 2 4
474	**Wisdorff, H.**	Chemins de fer d'Alsace et de Lorraine	2, 4
834	**Wisznicki**	Chemins de fer de l'Etat (Poland)	...
314	**Wood, G. K.**	Sudan Railways	2, 5
506	**Wood, M. V.**	London Midland and Scottish Railway	4
600	**Woodhouse, H. L.** (Colonel)	Government of India, Railway Department	1, 5
213	**Woolmington, R.**	Buenos Aires Western Railway	2, 3, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
378	**Woytt, F.**	Compagnie Internationale des Wagons-Lits et des Grands Express Européens.	2, 3, 4
360	**Wykander, Th.**	Chemin de fer Västergötland-Göteborg (Sweden)	...
604	**Yamaguchi, A.**	Japanese Government Railways	...
839	**Yamanouchi, T.**	South Manchuria Railway	...
529	**Young, S. G. S.**	Bombay, Baroda and Central India Railway	3, 5
68	**Yoyitch, M.** (Ing.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Jugoslavia)	2, 4
457	**Ytasse, E.**	Compagnie Générale des Voies Ferrées d'Intérêt Local (France)	1, 2, 5
341	**Zarifopol A.**	Chemins de fer de l'Etat (Rumania)	3, 5
375	**Zavadil, S.**	Chemins de fer de l'Etat (Czechoslovakia)	1, 3, 5
485	**Zens, A.**	Chemins de fer Départementaux (France)	4
488	**Zens, P.**	Chemins de fer Départementaux (France)	2

OPENING CEREMONY OF THE 13th SESSION

June 1st, 1937, at 10.45 a.m.

The inaugural meeting of the 13th Session took place in the large lecture hall of the *Maison de la Chimie*, the vast rooms of which had been placed at the disposal of the organisers of the Paris Congress.

The ceremony was enhanced by the attendance of Mr. Albert Lebrun, President of the French Republic. After he had been welcomed in the central drawing room of the *Maison de la Chimie* by the Minister of Public Works surrounded by high notabilities, the President entered the formal meeting room at 11.0 a.m.

In the President's box were gathered :

The Minister of Posts, Telegraphs and Telephones;

Mr. Marcel Régnier, Chairman of the Finance Committee of the French Senate;

The Prefect of the Seine Department;

The Prefect of Police;

Mr. Charlot, President of the Higher ailway Council;

Mr. Mollard, President of the Public Vorks Commission of the Senate;

Mr. Lafaye, President of the Public Vorks Commission of the Chamber of eputies;

Mr. Pomaret, Chairman of the Railway inance Committee of the Chamber of eputies;

Mr. Labbé, General Commissioner of ne Paris International Exhibition;

Mr. Tissier, Vice-President of the State ouncil, and

Mr. Weil-Rabaud, First Private Secreary to the Minister of Public Works.

The Diplomatic Corps, the Chief Delegates of the Governments represented at the Congress, the Members of the Permanent Commission and the Presidents of the French Railways took their seats on either side of the President's box.

The platform was occupied by :

Mr. Bedouce, Minister of Public Works;

Baron de Rothschild, Chairman of the Board of Directors, French Nord Railway;

Mr. Rulot, General Manager of the Belgian National Railways Company, and President of the Permanent Commission of the Association;

Mr. Grimpret, State Councillor, Vice-President of the Higher Council of Public Works; Chairman of the Board, French State Railways, and Member of the Executive Committee of the Permanent Commission of the Association;

Mr. Le Besnerais, Manager of the French Nord Railway, and Vice-President of the Permanent Commission of the Association;

The Right Hon. Lord Rockley, P.C., G.B.E., Director, Southern Railway (Great Britain), member of the Executive Committee of the Permanent Commission of the Association;

Mr. Vickers, Director, London Midland and Scottish Railway, member of the Executive Committee of the Permanent Commission of the Association;

Mr. Henry-Gréard, Manager of the Paris-Orléans Railway Company, member of the Permanent Commission of the Association;

Mr. DE BOYSSON, Assistant General Manager, P.O.-Midi Railways;

Mr. SURLEAU, Manager of the Alsace-Lorraine Railways, member of the Permanent Commission of the Association;

Mr. PELLARIN, Manager of the French Est Railway Company, member of the Permanent Commission of the Association;

Mr. GHILAIN, Ingénieur en chef du Matériel, Belgian National Railways Company, General Secretary of the Permanent Commission of the Association;

Sir H. NIGEL GRESLEY, C.B.E., D. Sc., Chief Mechanical engineer, London and North Eastern Railway, member of the Permanent Commission of the Association;

Dr. Th. KITTEL, Reichsbahndirektor, German State Railways, member of the Permanent Commission of the Association;

Mr. MUGNIOT, General Manager of the Paris-Lyon-Méditerranee Railways, member of the Permanent Commission of the Association;

Mr. LECLERC DU SABLON, Manager of the Midi Railway Company, and

Mr. CAMBOURNAC, Chief Civil Engineer, French Nord Railway.

Mr. Albert BEDOUCE, Minister of Public Works,

then welcomed the Delegates as follows :

« MONSIEUR LE PRÉSIDENT DE LA RÉPUBLIQUE,

« GENTLEMEN,

« It is my pleasant task to say on behalf of the French Government how pleased we are that you should have chosen PARIS as the venue for the 13th International Railway Congress.

« The presence of the President of the Republic at this inauguration is, moreover, a striking proof of the interes which France attaches to your meetings and of the pleasure it gives us to receive you among us.

« Allow me to say, Gentlemen, that in bowing to each of you, I express our friendly sentiments towards all railway workers in the countries you represent

« For us Frenchmen, 1937 is a centenary milestone in railway matters, because it recalls the first great debate which, before the representatives of the Nation, dealt in 1837 with the general problem raised by the first performances of this marvellous method of locomotion

« In spite of the creation of our first line, which was the work of the Engineer BONNIER of our « Corps des Mines », we had allowed ourselves to be out-paced by our friends in Great Britain and in Belgium.

« Nevertheless, the Saint-Simonians of Producteur had realised as far back as 1828 « that such a power could not be introduced among men without causing such a revolution in the state of Society that provincial towns in an Empire would become so many suburbs of the Capital ».

« 1837 was the time when Renan, coming from his native Brittany to Paris by mail-coach, was able to write to his mother on arrival at Saint-Germain : « Here I am in the land where the railway starts.

« Nobody could say nowadays where railways start, nor where they end, for their magnificent networks have become so wide-spread in the meantime.

« It is your magnificent work, Gentlemen, which it is your constant care t oster, which you have the legitimate and oble ambition to carry on, exalt and amlify : a glance at the headings of the eports, the name of their authors are ufficient guarantee in advance that you re capable of doing this.

« Your labours will be another mileone on the road of progress which, for er a century, railways have been treadg at a speed which no difficulties have icceeded in hampering, and of which no isis, however long and painful it may ive been, has succeeded in preventing e prodigious growth.

« Railways are truly an unceasing eation, for although at the start their ly ambition was that of fostering the arvellous destiny of coal by making use steam, in accordance with the vow of e Saint-Simonians they annihilated diances not only between the provinces d their capital, but also between nans furthest afield.

« Owing to the possibilities afforded the exchange and multiplication of reions, they completely altered economic iditions of mankind.

‹ It was not suficient that they reduc distances to the extent that the 20 ometres an hour achieved by Stepheni's « Rocket », hauling a 13-ton train 1829 have, a century later, become 100 ometres an hour with a 600-ton load; is you, Gentlemen, who, considering s a too modest performance, have e 1930 increased speed and power to h an extent that in Great Britain, the ted States of America, Germany and nce alone you total to-day : 60 000 metres run per day, at a commercial d of 100 kilometres an hour, and 0 kilometres per day run at 120 kilores an hour. You even run your tric trains, your railcars, your amlined trains at 140 kilometres an r.

« Tunnels had to be driven, rivers crossed, and as the technical means for accomplishing such wonderful tasks were never sufficiently powerful, you never ceased developing them.

« One might truly say that your untiring energy has rendered science ever more prolific; it is to your zeal that we owe the most remarkable achievements by human beings in the realm of efficiency of work and the use of power.

« Excavators, steam shovels, rotary drills were all called into being at your behest. You were the first, for our Northern System, to seize upon the wire on which Desprez in 1880 saw the birth of electric power carried to a long distance, and you thus promoted and justified the powerful hydraulic or steam power stations which are the pride of Science and Technique of the twentieth century.

« Carry on, Gentlemen ! That your labours of to-day may follow up and multiply your marvellous conquests is our most sincere desire.

« We bid you a hearty welcome to our Work Festival, under the flags of your Nations, fluttering in the breeze amidst ours, above a host of marvels created by the pacific emulation of peoples.

« May you reap a rich harvest of discoveries, you who have already accomplished that miracle of intelligence and force, the modern locomotive, you who cause tons and tons of steel to be cast every day and then lay it down to constantly extend your lines : a beneficent link which, throughout the Continents, strives to bring men together.

« Scientists, Railway Workers and Engineers, France, the land of work and peace, receives you as her best friends.

« Gentlemen,

« In the name of the Government of

the Republic, I declare opened the XIIIth Session of the International Railway Congress. *(Long applause.)*

Mr. RULOT, President of the Permanent Commission, replied as follows :

« Monsieur le Président,

« You have paid us the very great honour of personally attending the Inaugural Meeting of the XIIIth Session of the Railway Congress. Allow us to express our pride and great gratitude to You for so doing. *(Applause.)*

« It was already a pleasure to us to think that we were about to open our traditional Session in the beautiful capital of France, and in the setting of your magnificent Exhibition.

« The presence at our opening meeting of the Highest Authority in this Country gratifies our wishes in a way we had not dared to expect.

« One single word will be enough to express the feelings of all those attending this Congress : the homely and typically French word « Merci ».

« We thank You, Monsieur le Président, not only because You have thus shown in a special manner the interest You take in the progress of railways, but also because we know that Your high technical training and knowledge enable You better than anyone else to appreciate the constant efforts we all of us put forth with a view to improving the working of our railways.

« We thank You, Monsieur le Président, and also the French Government, and in particular H. E. the Minister of Public Works, whose cordial speech of welcome appears to reflect the kindness which we have everywhere encountered since our first contact with the French Authorities.

« The French Local Organizing Commission has spared no pains, and the organisation which it has set afoot has exceeded everything we could possibly wish for.

« This perfection in the organizatio enables us to state that the Congress wil be able to formulate practical conclusion which will be all helpful to the moral, in tellectual and social welfare of railways *(Applause.)*

« Monsieur le Président,

« Ladies,

« Gentlemen,

« A Congress means each time a ste forward in the labours of our Associa tion. We stop for a moment to analys the results achieved, but we also cast ou eyes back over the road we have jus travelled.

« Alas, what a number of tombstone strew the road connecting Cairo to Pa ris!

« The Right Hon. Viscount Churchil Chairman of the Great Western Railwa Company, who presided the London Co gress in 1925, with a distinction whic many of you will bear in mind, will n longer enable us to listen to his Britis eloquence, full of humour.

« Mr. Gaytan de Ayala, former Chai man of the Spanish Council of Publ Works, who assumed with all the sout ern enthusiasm the presidency of the M drid Congress, in 1930, has also left o ranks and entered into perpetual retir ment.

« On the other tombstones, I see e graved the names of :

« General Atterbury, President of t Pennsylvania Railroad;

« Mr. Molle, Technical Secretary, G neral Manager's Office, Belgian Nation Railways Company;

Formal opening Meeting of the XIIIth Session at the « Maison de la Chimie ».
Mr. Bedouce, French Minister of Public Works, making the inaugural speech.

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« Sir Frederick PALMER, Consulting
ngineer to the Government of India;

« Mr. G. PHILIPPE, Inspector General,
ord-Belge Lines;

« Youssef RISGALLAH Bey, Member of
e Board of Management of the Egyp-
an State Railways;

Mr. Gustav BEHRENS, Former Director,
ondon Midland and Scottish Railway,
nd Honorary Member of our Associa-
on.

« We shall keep the best remembran-
of these colleagues who were good
ough to devote to the work of our As-
ciation the assistance of the fine spirit
ith which they were endowed, and of
eir great competency, tempered by long
perience.

« Their absence will be felt all the
ore keenly by us because we shall miss
eir wise advice when discussing ques-
ons of particular importance submitted
this year's Congress.

« Thirteen questions will be discussed.
feel it is unnecessary to enumerate all
them and will therefore confine my-
lf to mentioning a few of them, drawn
om each of the five sections :

« 1. The construction of modern track
carry heavy loads at high speeds;

« 2. The use of welding to obtain ex-
a-long rails;

« 3. Evolution of the rail motor car as
gards its construction, and special in-
stigation into the transmission and
ake questions;

« 4. Methods and devices used, in con-
ction with electric traction, to save cur-
nt;

« 5. Economical operation of the main
e systems' secondary lines;

« 6. Application of rational organisa-
n (planning) to the transport of goods;

« 7. Effects of the world crisis and road competition on the railway position;

« 8. Selection, orientation, and instruction of railway staff;

« 9. Co-ordination of operation as between main-line railways and light railways.

« If I specially mention these nine questions, it is not because their importance exceeds that of the others, but because they concern new tendencies.

« It is no longer a matter for the railways of confining themselves to perfecting their installations, their plant, their working methods : it is not sufficient to rejuvenate, we must create.

« Perhaps you will allow me to particularly stress this point.

« During the last few years some people, who profess to be really enlightened, have in all seriousness gone about preaching the end of Railways. All those who provide the sinews of war for railways and those who gain their livelihood from them naturally revolt against such a grim prophecy which, moreover, is against common sense. And yet, I must confess that after due reflection, I had to admit that if railways had continued to be worked on former methods, they would have died of consumption.

« But Railways also have their physiology and in their case, also, the need creates the means.

« The world needs and will always need railways, but railways adapted to new economic requirements. It is these changes in requirements which railway managers have to discover and blend wisely with their own working methods. It is thus that are born the new conceptions, of which the questions submitted to this Congress bear the imprint.

« Speed has to be increased, but in order to attain higher speeds it is not enough to discover faster engines : the track must also be improved.

« We may be allowed to smile when misguided persons point to railways as an out-of-date means of locomotion. Really, are they blind to all progress ? Have they wilfully shut their eyes to facts? It is scarcely necessary to make a rejoinder, since everyone knows that nowadays speeds of 140 kilometres per hour are nothing uncommon. Now, the increase in speed has a direct influence on the whole organisation of the working of railways.

« But acceleration is expensive, and yet the price of transport must not be increased. Therefore investigations were carried out at once to see what savings could be effected, and the outcome was the simplification of the service on secondary lines. The consequence, which may seem paradoxical at first sight, has been greater working flexibility combined with an appreciable saving in expenditure.

« Progress only makes the public keener in its demands, with the result that it now asks for more frequent and faster services. The demands of the public are curious. When they make their appearance, they are often considered as of trifling importance, they are given little attention and sometimes even go quite unheeded. But these demands persist and grow more imperative. They are then gone into and in the end it is found that they are well founded and can be complied with.

« It was thus that railcars made their appearance among railway rolling stock and have been the means of providing, even between towns situated comparatively far apart, actual tramway services. The growing development of electrification is due to the same cause.

« But it is not the sole duty of railways to satisfy the demands of the public. Really sound working pre-supposes that genuine confidence unites the whole staff. It is our duty to provide for railway servants' welfare in the widest sense of the word, and to see that each man's services are used to the best of his ability.

« This is a very important social problem, which our 4th Section will go into, and the happy solution of which will undoubtedly play its part in contributing towards harmony and peace.

« All this may appear very dry and forbidding to you, but the minute one starts to study such matters seriously they become really attractive problems.

« MONSIEUR LE PRÉSIDENT,
« LADIES,
« GENTLEMEN,

« Now that we have briefly passed in review the various tasks which the Congress is about to undertake, we have to think of appointing those under whose auspices our work is to be carried out.

« It is my great pleasure to announce that the PRESIDENT OF THE FRENCH REPUBLIC has graciously accepted to act as Honorary President.

« H.E. the French MINISTER OF PUBLIC WORKS has consented to act as Honorary Vice-President.

« The Congress congratulates itself upon these acceptances which place the XIIIth Session under the most illustrious patronage.

« I take the liberty of requesting Baron DE ROTHSCHILD to kindly accept the post of President.. His long experience of railways and the remarkable results which his Company has achieved clearly point to him to direct our work towards tangible results.

« Without a doubt, I shall be express- g the unanimous wish of this Assem- y in asking Messrs. LE BESNERAIS, Ma- ger of the French Nord Railway Com- ny, and HENRY-GRÉARD, Manager of the ris-Orléans Railway Company to ac- pt the vice-presidency of the Congress.

« Placed under such brilliant auspices, e work you are about to acomplish, ntlemen, will, I am convinced, light e road which railways are called upon tread throughout the ages. *(Prolong- applause.)*

Baron E. de ROTHSCHILD then said :

« In enterring upon the high functions iich have devolved upon me to-day, I el a certain emotion which I cannot de, for I am overwhelmed by the hon- r which is paid me, not, I trust, per- nnally, but as a mark of esteem for the iole of the French Main-Line Railways.

« The President of the Republic has aciously consented to attend the inau- ral ceremony of the Congress and thus hance its splendour, a mark of esteem iich must have gone to the heart of all Members present. We trust that Mon- ur le Président de la République will gn to receive the homage and grati- le of those entrusted with the manage- nt of all the railways represented here.

Excellency,
GENTLEMEN,

On behalf of all my colleagues I wish thank the Minister of Public Works the good-will he has just expressed, his eloquent speech, towards us, and the manner in which he emphasised importance of to-day's meeting.

It was in particularly friendly terms Mr. Rulot proposed me as president the sittings of this Congress. I am e overcome and can only thank him sincerely. Mr. Rulot is the eminent President of the International Railway Congress Association. He devotes his time to it with competency and a touching affability. He has succeeded in imprinting upon it a guiding hand that has created and maintained among all its adherents a spirit of harmony which is invaluable for the success of this Organisation.

« The present organisation has marked its place, one of the foremost, in the history of international relationship. It constitutes one of the elements most apt to bring nations together, and thus contribute to facilitate economic agreements. This organisation is not of recent date, having already over half a century of existence, a past wich gives it a real prestige. It is therefore only fair to place on record the merit of those who were the first to promote an international meeting of this kind.

« It is to Belgium that the honour of this initiative is due. In order to celebrate the 50th anniversay of their railways, the Belgian Government had the inspiration, in 1885, of inviting to Brussels the delegates of most of the foreign railways. During the conferences that were then held, there was laid the foundation of a permanent association which has vastly expanded and from which we benefit to-day.

« What a splendid and noble conception to have thought of thus periodically bringing together those in charge of the destinies of the large railway systems in all countries, and thus enabling them to know each other, to understand one another and to come to useful agreements. Are we not all animated by the same aspirations, above all discussions : to improve the railway services, to increase traffic, incite the public to travel and develop exchanges; does that not mean working in the interests of worldwide economic properity?

« This is the third time that the session of our Congress is being held in our capital and, as formerly in 1889 and in 1900, during an International Exhibition. We are very flattered by the mark of esteem thus shown us, and I wish to thank the members of the Permanent Commission who advanced by one year the date originally fixed, viz. 1938.

« To-day, our Congress draws from the troubled circumstances, through which we are passing, a real importance for the improvement of economic relations between all Nations. The whole world is in a state of evolution and transformation. From whatever standpoint one may view the present situation : economic crisis, financial crisis, there is no doubt that the question of interchange and transactions necessarily comes to the forefront. These very complex problems will be fully discussed by your Committees, just as much as the technical and commercial questions that affect all railway systems. You will have to deal with the improvement of international services as well as all the technical progress that still remains to be achieved.

« The Commission which sits permanently in Brussels has carefully formulated the order and method to be observed during the course of your labours. The delegates of the railway systems will set to work and, thanks to their competency and high standing, will draw up resolutions that will be acted upon.

« The Permanent Commission has drawn up a whole programme of questions that appear on today's agenda for the 13th Session, and which are divided among the following 5 sections :

« Section I. — Way and Works.

« Section II. — Locomotives and rolling stock.

« Section III. — Working.

« Section IV. — General.

« Section V. — Light railways an
colonial railways.

« Among the matters submitted t
your debates there are two questior
of exceptional importance to railway
and which the Cairo Congress, held i
1933, decided to submit to periodical r
view during the periods in between Co
gresses. These are :

« 1. Rail motor cars from the point
view of their construction.

« 2. The world crisis and its effects o
railway working.

« The economic crisis has had serio
repercussions on railway traffic. But
is competition from other methods
transport which has caused much mo
harm to our systems, harm of extren
gravity owing to the great disturbance
has caused in the fundamental worki
of railways. Railways have just suffer
somewhat from an eclipse. During th
period, how much has not been said a
written to throw discredit upon then
And how fiercely and unjustly! Never
any moment, however, did they show a
discouragement.

« And how have the large railway
stems reacted? By increasing the ener
of their efforts twofold, by working
lently to renovate their working meth
in all departments, both from a techni
and commercial standpoint, as Mr. Ru
so eloquently explained.

« No, Gentlemen, railways are not
the wane. On the contrary, they are
pidly reviving : and this they owe to
eminent men who are at the head
them, as well as to their engineers, w
are remarkable for their professio

onscience and their great technical vorth. But nothing final can be plann-d, no more good can be achieved if one ontinues to procrastinate, as has so long een the case, to hesitate and tergiversate. ction must be taken, and quickly, in the ublic interests, from the economic and inancial points of view in the various ountries, as well as in the interest of all arriers, whoever they may be. It is un-ler these circumstances that intervention y this Congress may make itself felt in particularly useful way. The resolu-ions that it will adopt will be decisive nd will be gratefully received.

« As to railcars, they had hardly left he workshops and been submitted to ractical tests, when they took a pre-minent place in the operating of rail-vays. They have, at the present time, ecome instruments of precision, work-ng with surprising regularity, with in-omparable flexibility, and providing uch advantages that the public are villingly returning to the railways. Im-rovements are always possible both as egards these new means of locomo-on and all other kinds of traction. othing can astonish us in the way of ew discoveries, coming from engineers s eminent as those who, in all countries, re constantly studying technical pro-lems and devoting themselves to their ork in a scientific and inventive spirit.

« There remains for us a task to ac-omplish, a serious one without a doubt, ut equally pleasant : that of providing ome recreation for you. A certain num-er of excursions have been organized ith a view to enabling you to get a pid insight into our homeland : Fran-, and to visit some of its famous sites. rance has the privilege of possessing regions very different from one another, varying both as to configuration, climate, nature of their soil and as to their products. It is perhaps bad taste for me to praise the charms of our country : it will be better for you to discover them yourselves, but I have often heard people, when speaking about our country, use the term « Beautiful France », and this flattering expression derives its origin from a characteristic common to all our provinces : that of a smiling aspect, of which I should like you to get an impression.

« I appeal to your indulgence to forget that it is I who have thus spoken to you. I would only ask one thing of you : to remember that we bid you a most cordial welcome, and that we have the sincere desire to make your stay in our midst as pleasant as possible. *(Long applause.)*

In order to complete the Bureau of the Session, Baron DE ROTHSCHILD proposed to make the following appointments :

General Secretaries :

Mr. P. GHILAIN, General Secretary of the Permanent Commission;

Mr. DE BOYSSON, Assistant General Manager, Paris-Orléans and Midi Railways;

Mr. CAMBOURNAC, Chief Civil Engineer, French Nord Railway.

Assistant General Secretaries :

Sir H. Nigel GRESLEY, C.B.E., D. Sc., Chief Mechanical Engineer, London and North Eastern Railway;

Dr. Th. KITTEL, Reichsbahndirektor, German State Railways.

These appointments were received with the unanimous applause of the Delegates.

— The Meeting was closed at 11.30.

GENERAL OFFICERS OF THE SESSION

Honorary President :
M. Albert LEBRUN, President of the French Republic.

Honorary Vice-President :
M. BEDOUCE, French Minister of Public Works.

President :
Baron Edouard DE ROTHSCHILD, Chairman of the Board, French Nord Railway Company, President of the Executive Committee of the French Main-Line Railways.

Vice-Presidents :
M. LE BESNERAIS, Manager of the French Nord Railway, (vice-president of the Permanent Commission of the Association).
M. HENRY-GRÉARD, Manager of the Paris-Orléans Railway Company (member of the Permanent Commission of the Association).

Statutory Vice-Presidents :
Austria. — PRINZ, Chef de section au Ministère Fédéral des Transports.

Belgium. — CASTIAU, Secrétaire général du Ministère des Transports (member of the Permanent Commission of the Association).

Bulgaria. — G. SGOUREFF, Ingénieur, Directeur général adjoint des Chemins de fer et des Ports de l'Etat (member of the Permanent Commission of the Association).

Chile. — LETELLIER-ESPINOLA, Ingénieur, ex-ministre d'Etat, membre du Conseil supérieur des Chemins de fer.

China. — Dr. C. C. WANG, Representative in Great Britain of the Chinese Ministry of Railways (member of the Permanent Commission of the Association).

Czechoslovakia. — J. HONDL, Chef des Services du Personnel au Ministère des Chemins de fer.

Denmark. — P. KNUTZEN, Directeur général des Chemins de fer de l'Etat (member of the Permanent Commission of the Association).

Egypt. — KHALIL FAHMY HUSSEIN BEY, Assistant General Manager, State Railways.

Finland. — H. HOLMA, Envoyé Extraordinaire et Ministre plénipotentiaire de Finlande à Paris.

France. — M. BEDOUCE, Minister of Public Works.

Germany. — Dr. Ing. eh. J. DORPMÜLLER, Minister of Communications, General Manager of the German State Railways (member of the Permanent Commission of the Association).

Great Britain, India, Dominions, Protectorates and Colonies :

A) *Great Britain.* — Sir Cyril HURCOMB, K.B.E., C.B., Secretary, Ministry of Transport (member of the Permanent Commission of the Association).

B) *India.* — Col. WOODHOUSE, Director of Civil Engineering, Railway Board.

Italy. — H. E. Mario JANELLI, Sous-Secretaire d'Etat, Ministère des Communications.

Japan. — Y. HASHIGUCHI, Chief of the Railway Research Service.

Jugoslavia. — YOYITCH, Directeur Général adjoint des Chemins de fer de l'Etat (member of the Permanent Commission of the Association).

Luxemburg. — DUMONT, Premier Commissaire du Gouvernement pour les Chemins de fer

Netherlands. — Th. M. B. VAN MARLE, Inspecteur generaal van het Verkeer, Rijksverkeersinspectie (member of the Permanent Commission of the Association).

orway. — O. STORSAND, Directeur des Chemins des Chemins de fer de l'Etat.

oland. — H. E. A. BOBKOWSKI, Sous-Secrétaire d'Etat, Ministère des Communications.

ortugal. — RAMALHO, Directeur Général des Chemins de fer, Vice-Président du Conseil Supérieur des Chemins de fer.

umania. — G. PANAITOPOL, directeur général adjoint des Chemins de fer de l'Etat.

iam. — C. P. SANDBERG.

weden. — A. M. GRANHOLM, Directeur Général des Chemins de fer de l'Etat (member of the Permanent Commission of the Association).

witzerland. — P. KRADOLFER, directeur de l'Office Fédéral des Transports (member of the Permanent Commission of the Association).

General Secretaries :

P. GHILAIN, Ingénieur en chef au Service de la Traction et du Matériel de la Société Nationale des Chemins de fer belges (General Secretary of the Permanent Commission of the Association).

DE BOYSSON, directeur général adjoint des Chemins de fer P.O.-Midi.

CAMBOURNAC, ingénieur en chef des Travaux et de la Surveillance de la Compagnie du Chemin de fer du Nord français.

Assistant General Secretaries :

Sir H. Nigel GRESLEY, C.B.E., D.Sc., Chief Mechanical Engineer, London & North Eastern Railway (member of the Permanent Commission of the Association).

Dr. Th. KITTEL, Reichsbahndirektor, Deutsche Reichsbahn (member of the Permanent Commission of the Association).

OFFICERS OF SECTIONS.

SECTION I. — **Way and Works.**

President : Sir Ralph L. Wedgwood, chief general manager, London and Nort Eastern Railway (member of the Permanent Commission of th Association).

Vice-Presidents :

Y. Hashiguchi, chief of the Railway Research Office, Jap nese Government Railways;

Sir Walter Nugent, Chairman, Great Southern Railways (Ir land);

C. Melissinos, Directeur Général des Chemins de fer de l'Et (Greece);

Philipoff, Ingénieur en chef des Chemins de fer de l'Etat (Bu garia).

Principal Secretary : J. Dubus, ingénieur au Service de la voie, Société Nationale d Chemins de fer belges.

Secretaries :

Schutz, Ingénieur principal aux Services techniques de l'Exploitation, Alsace-Lorraine Railways;

Dr.-Ing. G. Schramm, Reichsbahnrat, Deutsche Reichsbahn;

Walter, Chef de division adjoint au Serv de la Voie des Chemins de fer de l'Et France;

J. W. Whiteside, Drawing Office, Ch Mechanical Engineer's Department, Lond Midland and Scottish Railway.

SECTION II. — **Locomotives and Rolling Stock.**

President : Prof. Dr.-Ing. eh. W. Wechmann, Reichsbahndirektor, Deuts Reichsbahn.

Vice-Presidents :

P. Koller, Ingénieur, Directeur des Services de la Traction et Matériel des Chemins de fer de l'Etat, Czechoslovakia;

Ing. W. Hupkes, Chef du Service de la Traction et du Matér Netherlands Railways;

O. Storsand, Directeur des Chemins de fer de l'Etat, Norway;

O. H. Munck, Directeur du Matériel et de la Traction des Chem de fer de l'Etat, Denmark.

Principal Secretary : A. W. Chantrell, Ingénieur principal au Service du Matér Société Nationale des Chemins de fer belges.

Secretaries :

SANTINI, Ingénieur, Chef de la Division des Combustibles, Compagnie des Chemins de fer de Paris à Lyon et à la Méditerranée;

EMERING, Inspecteur au Service du Matériel et de la Traction, Alsace-Lorraine Railways;

K. GÜNTHER, Direktor bei der Reichsbahn;

A. E. BERESFORD, London and North Eastern Railway.

SECTION III. — **Working.**

President : PELLARIN, Directeur de la Compagnie des Chemins de fer de l'Est, France (member of the Permanent Commission of the Association).

Vice-Presidents : J. A. VALENTIN, Chef d'arrondissement des Chemins de fer de l'Etat, Sweden;

M. YOYITCH, Directeur général adjoint des Chemins de fer de l'Etat, Jugoslavia (member of the Permanent Commission of the Association);

F. STOCKINGER, Président des Chemins de fer fédéraux, Austria;

H. ETTER, membre de la Direction générale des Chemins de fer fédéraux, Switzerland.

Principal Secretary : J. VAN RYN, Ingénieur principal au Service de la Voie, Société Nationale des Chemins de fer belges.

Secretaries :

Dr.-Ing. A. BAUMANN, Reichsbahndirektor, Deutsche Reichsbahn;

CHAPERON, Chef des Services administratifs, Compagnie du Chemin du Nord, France.

MANGE, Inspecteur principal, Service de l'Exploitation de la Compagnie des Chemins de fer de Paris à Lyon et à la Méditerranée;

D. J. CARLING, London and North Eastern Railway.

SECTION IV. — **General.**

President : Prof. Dr.-Ing. A. WASIUTYNSKI, Vice-Président du Conseil technique des Chemins de fer, Poland.

Vice-Presidents : W. H. BARNES, General European Agent, Pennsylvania Railroad Company;

G. PANAITOPOL, Directeur général adjoint des Chemins de fer de l'Etat, Rumania;

Dr. D. FEZAS VITAL, Administrateur de la Compagnie des Chemins de fer portugais, Portugal;

DEMARET, Inspecteur principal au Service de l'Exploitation, Société Nationale des Chemins de fer belges.

Principal Secretary : A. ALLARD, Directeur à la Société Nationale belge des Chemins de fer vicinaux.

Secretaries :

BOURREL, Société des Transports en commun de la Région parisienne;

DUCHATEL, Ingénieur adjoint du Contrôle des Travaux extérieurs, Compagnie des Chemins de fer de Paris à Lyon et à la Méditerranée.

Dr. G. HEIN, Ministerialrat, Reichsverkehr ministerium, Germany.

B. HARPER, London Midland and Scotti Railway.

SECTION V. — **Light Railways and Colonial Railways.**

President : E. MELLINI, Inspecteur supérieur de vigilance, Inspectorat géné des Chemins de fer, Tramways et Automobiles, Italy.

Vice-Presidents :

Th. H. WATERMEYER, general manager, South African Railwa and Harbours;

Lt. Col. R. E. GORDON, Executive engineer, North Western Ra way (India);

Dr. C. C. WANG, representative of the Chinese Ministry of Ra ways in England (member of the Permanent Commission of t Association);

Dr. O. DE SENN, Secrétaire d'Etat, Président de la Direction d Chemins de fer royaux de l'Etat (Hungary) (member of t Permanent Commission of the Association).

Principal Secretary : A. ALLARD, Directeur à la Société Nationale belge des Chemins fer vicinaux.

Secretaries :

BOURREL, Société des Transports en commun de la Région parisienne;

DUCHATEL, Ingénieur adjoint du Contrôle des Travaux extérieurs, Compagnie des Chemins de fer de Paris à Lyon et à la Méditerranée;

Dr. K. SAUER, Ministerialrat, Reichsverkel ministerium (Germany) (member of Permanent Commission of the Associatio

B. HARPER, London Midland and Scott Railway.

General Interpreter : Dr. A. VELLEMAN.

Programme of the sectional meetings.

Programme of th

DATE.		SECTION I. — WAY AND WORKS.	SECTION II. — LOCOMOTIVES AND ROLLING STOCK
Wednesday, June 2nd .	*9.0 a. m.*	Installation of the Section and fixing the programme of procedure.	Installation of the Section and fixing the programme of procedure.
	9.30 a. m.	←	**Examination of proposed alterati**
		I. The construction of modern track to carry heavy loads at high speeds, and methods of modernising old track for such loads and speeds. Facing points which can be taken at high speeds.	IV. Evolution of the rail motor car regards its construction, and speci investigation into the transmissio and brake questions. Comparati methods of testing railcars. Detail investigation into the costs of ra cars and the methods of reducin them. *With Section III.*
Thursday, June 3rd .	*9.30 a. m.*	I. The construction of modern track to carry heavy loads at high speeds, and methods of modernising old track for such loads and speeds. Facing points which can be taken at high speeds. *(Concluded.)*	IV. Evolution of the rail motor car regards its construction, and speci investigation into the transmissi and brake questions. Comparati methods of testing railcars. Detail investigation into the costs of ra cars and the methods of reduci them. *(Concluded.)* *With Section III.*
Friday, June 4th . . .	*9.30 a. m.*	II. Use of welding : (1) to obtain extra-long rails; (2) in manufacturing and repairing points and crossings. (*a*) Results obtained by using extra-long rails. Methods used to ensure safe expansion of the rails and anchoring of the track; (*b*) Technical and financial results shown by welding points and crossings.	V. Recent improvements in steam lo motives of the usual type and tes of new designs (high-pressure re procating locomotives and turbi locomotives) as regards constructi quality of materials used, efficien working conditions, maintenance a financial results. Testing locon tives at locomotive experimental s tions, and in service with dynan meter cars and brake locomotives
Monday, June 7th . .	*9.30 a. m.*	←	**Ple**
Tuesday, June 8th . .	*9.30 a. m.*	II. Use of welding : (1) to obtain extra-long rail; (2) in manufacturing and repairing points and crossings. (*a*) Results obtained by using extra-long rails. Methods used to ensure safe expansion of the rails and anchoring of the track; (*b*) Technical and financial results shown by welding points and crossings. *(Concluded.)*	VI. Methods and devices used, in conn tion with electric traction, to sa current between the supply side the power station and the drivi wheels (feeders, substations, tr tors), and in particular the use mercury rectifiers.
Wednesday, June 9th .	*9.30 a. m.*	III. Methodical and periodical maintenance of : (1) metal bridges; (2) signals; (3) metal supports carrying the contact wire on electric railways.	VI. Methods and devices used, in conn tion with electric traction, to sa current between the supply side the power station and the drivi wheels (feeders, substations, tr tors), and in particular the use mercury rectifiers. *(Concluded.)*
Thursday, June 10th .	*9.30 a. m.*	III. Methodical and periodical maintenance of : (1) metal bridges; (2) signals; (3) metal supports carrying the contact wire on electric railways. *(Concluded.)*	IX. Results obtained from the auto tic and distant operation of sig and points, and from locomo cab signals. *With Section III.*
Friday, June 11th . .	*9.30 a. m.*	←	**Pl**
	11.0 a. m.	←	**Closing cere**

ectional meetings.

SECTION III. — WORKING.	SECTION IV. — GENERAL.	SECTION V. — LIGHT RAILWAYS AND COLONIAL RAILWAYS.
nstallation of the Section and fixing the programme of procedure.	Installation of the Section and fixing the programme of procedure.	Installation of the Section and fixing the programme of procedure.
the Rules and Regulations —— →		
V. Evolution of the rail motor car as regards its construction, and special investigation into the transmission and brake questions. Comparative methods of testing railcars. Detailed investigation into the costs of railcars and the methods of reducing them. *With Section II.*	X. Effects of the world crisis and road competition on the railway position. Corresponding changes in railway commercial policy.	...
V. Evolution of the rail motor car as regards its construction, and special investigation into the transmission and brake questions. Comparative methods of testing railcars. Detailed investigation into the costs of railcars and the methods of reducing them. *(Concluded.)* *With Section II.*	X. Effects of the world crisis and road competition on the railway position. Corresponding changes in railway commercial policy.	...
I. Economical operation of the main line system's secondary lines. Various methods adopted to adjust the operating facilities, safety measures, and station organisation to the volume of traffic.	XI. Selection, orientation, and instruction of railway staff.	...
ting —— →		
I. Co-ordination of operation as between main-line and light railways. *With Section V.*	X. Effects of the world crisis and road competition on the railway position. Corresponding changes in railway commercial policy. *(Concluded.)*	XII. Co-ordination of operation as between main-line and light railways. *With Section III.*
. Application of rational organisation (planning) to the transport of goods. *With Section V.*	...	VIII. Application of rational organisation (planning) to the transport of goods. *With Section III.*
Results obtained from the automatic and distant operation of signals and points, and from locomotive cab signals. *With Section II.*	...	XIII. Specifications for the fixed plant of railways with light traffic, intended to prevent the use of unnecessarily expensive track equipment, and generally to give economical working.
ing. —— →		
e Session. —— →		

Summary report of the discussions in the sections.

1st SECTION . — Way and Works.

President : Sir Ralph L. Wedgwood.
Vice-Presidents : Y. Hashiguchi, Sir Walter Nugent, C. Melissinos and Philipoff.
Principal Secretary : J. Dubus.

QUESTION I.

The construction of modern track to carry heavy loads at high speeds, and methods of modernising old track for such loads and speeds. Facing points which can be taken at high speeds.

Preliminary documents.

Report (Bulgaria, Egypt, Spain, France and Colonies, Greece, Italy, Portugal and Colonies, Rumania, Czechoslovakia, Turkey and Jugoslavia), by H. Flament. (See *Bulletin,* December 1936, p. 1447, or special issue No. 10.)

Report (Germany, Austria, Belgium and Colony, Denmark, Finland, Hungary, Luxemburg, Norway, Netherlands and Colonies, Poland, Sweden and Switzerland), by C. Lemaire. (See *Bulletin,* February 1937, p. 357, or special issue No. 18.)

Report (America, Great Britain, Dominions and Colonies, China and Japan), by T. Yamada and Y. Hashiguchi. (See *Bulletin,* March 1937, p. 503, or special issue No. 20.)

Special Reporter : H. Flament. (See *Bulletin,* June 1937, p. 1487.)

Report of Section I.

(See *Daily Journal of the Session,* No. 2, p. 2; No. 3, pp. 1 to 3; No. 5, p. 1)

Meeting held on June 2nd, 1937.

The President called upon Mr. Flament *(Special Reporter)* who, after having thanked the other reporters, gave a brief résumé of his special report and then read *Summary No. 1.*

1. Except on the Railways in North America, where the axle load reaches 35 tons, the general limit is 20 tons. The tendency of the rolling stock designers at the present time is to make it 20 to 25 tons, according to the Railways concerned.

The speed of 120 km. (75 miles) an hour, the usual maximum for a long time for passenger trains, has been exceeded in many cases. The tendency at the present time is to authorize speeds of about 150 km. (93 miles) an hour for ordinary trains, and 160 km. (100 miles) an hour for railcars and rail motor trains.

Under these conditions the track stresses will henceforth include an increasing part due to the dynamic effects of the loads moving at high speeds. It is desirable, for this reason, that these dynamic effects should be investigated by means of experiments, tests and measurements in all the fields in which they may show themselves, both to guide the builders in finding suitable ways of balancing and distributing the forces, and to appreciate the stresses the track must be effectively able to stand.

Mr. BOUTELOUP *(Midi Railways, France)* asked the Japanese Reporter if the data appearing in his report in table No. 6 (Ratio of the lateral bending stress to the vertical bending stress in the rail foot) are the results of experiments or of calculations. The reply was that they were results obtained from experiments made.

Mr. LEMAIRE (*Reporter*) pointed out the great difference between the maximum weights of the vehicles and of their axle loads on American Railways and those on European Railways.

His opinion, looking at it solely from the permanent-way point of view, was that it was not necessary to consider for Europe an increase in axle loads (20 to 25 tons) at present proposed, nor to exceed speeds of 150 to 160 km. (93 to 100 miles) per hour.

— From the statements made by Messrs. SHERRINGTON (*London and North Eastern Railway*), DRIESSENS (*Netherlands Railways*), and MISZKE (*Polish Ministry of Communications*), it appeared that it was the appreciably greater dimensions of the constructional gauge on American Railways which led them to adopt very much higher axle loads than those in Europe. It was stated, for example, that goods trains were running in America weighing 15 000 short tons, and passenger trains composed of 19 all-steal coaches each weighing 80 short tons.

Dr.-Ing. MÜLLER (*German State Railways*) then gave some information about some little known experiments which have been recently carried out on the German Railways : trains reaching 200 km. (125 miles) per hour have been run experimentally on lines laid with 50-kgr. per metre (101 lb. per yard) rails, without anything abnormal or uncomfortable being noticed. The line in question was well laid and perfectly level, two conditions which are indispensable for the running of such trains. While comparatively light and very fast trains caused no appreciable damage to the track, on the contrary very heavy goods trains running at relatively low speeds caused serious damage, especially as regards the levelling and particularly at the joints.

Taking these facts into account, the German State Railways are considering the classification of their lines into two categories, namely those intended for international traffic at very high speeds and reduced loads on the one hand, and on the other, the lines intended for very heavy goods trains running at very low speeds.

Finally, Dr. MÜLLER emphasized the importance of definitely laying down how the speeds of trains passing through curves on the various railways were to be determined. In Germany, the formula : $V. = 4.5 \sqrt{R}$ is used.

Mr. FLAMENT stated that on the French Nord Railway, the speed was fixed after trials, and that, at present, it reached 120 km. (75 miles) per hour through curves having a radius of 500 m. (25 chains) and 140 km. (87 miles) an hour over curves of 800 m. (40 chains) radius. These speeds, which constitute maximums, are only allowed if the lay-out is excellent, the superelevation sufficient and the transition carefully laid out.

Mr. BOUTELOUP stated that on his System the maximum superelevation was until recently 180 mm. (7 3/32 inches) corresponding to an average centrifugal force which is arrived at by considering the maximum and zero speeds. On the electrified lines which are used for high-speed trains, the French Midi Railways have adopted the formula : $h = \frac{7.5\ V^2}{R}$ instead of $\frac{5.9\ V^2}{R}$ previously used.

Mr. R. LÉVI *(French State Railways)* stated that his System had been making use for about ten years of the idea of insufficiency of superelevation. The latter up to the present had been 150 mm. (6 inches) for ordinary trains running through curves of a radius equal to or over 500 m. (25 chains). Trials made with the Hallade, Mauzin and quartz accelerograph apparatus have confirmed the value of this practice.

The systematic use of the versines method and the use of « doucines » in the transitions are, moreover, valuable complements to be used.

Mr. COULLIÉ (*French Midi Railways*) stated that his System had carried out some trials in order to determine the average work corresponding to the movement of a passenger when the train passes from a straight line unto a curve or vice-versa. These trials had resulted in formulæ very similar to that proposed by Messrs. BAUMANN and JAEHN at the 12th Session, in Cairo.

After this exchange of views, and on the proposition made by THE PRESIDENT, Summary No. 1 of Mr. FLAMENT's special report was adopted by the Meeting.

Mr. FLAMENT then read the clauses Nos 2, 3, 4, and 5, which had alrea been partially dealt with in the cour of the preceding discussion.

2. The heavy loads and high spee impose upon the present-day rail me a stress which in most cases it would difficult to increase without affecti the behaviour and life of rails.

The weight of the rails on the m heavily loaded lines in Europe is abo 50 kgr./m. (100 lb. per yard). The are still differences of opinion as to t desirability of increasing the weight the rails to meet the increasing str resulting from the loads and speeds.

The length of the rails and the ty of rail joint vary much, according the Railways. The conditions of use extra-long rails are still under inves gation and cannot be determined exac at present.

3. The wooden sleeper is the m suitable for very high speeds. Incre ing the sleepering is one of the metho which contribute to the strengtheni of the track in order to enable it to car the heaviest loads with the least dama

Vehicles running at high speed und satisfactory conditions as regards co fort and safety require the track to perfectly level as well as in good ali ment and correct to gauge. These co ditions can only be fulfilled if t fastenings securing the rails to the sl pers are perfectly maintained and ti tened up. The use of bearing pla between the rails and the sleepers, w suitable fastening devices, is the gene practice on many Railways and appe desirable, at least in those parts of t track which include curves of small dius.

4. By increasing the depth of t ballast, the loads can be better dist buted on the track. The ballast shou be homogeneous and of good permea lity, and consist of broken stone, the mensions of which should not exce 6 to 7 cm. (2 3/8″ to 2 3/4″).

Mr. Stoika (*Rumanian State Railways*) roposed that additions should be made s follows. (1) The second sentence in ummary 3 should be completed with the ollowing text : « and to give a better esistance to the lateral forces at high peeds »; (2) the first sentence in Summary 4 should be completed by the vords : « and the vertical forces... ».

— These proposals were adopted by the Ieeting.

The President then declared the Meeting closed.

Meeting held on June 3rd, 1937.

— Lord Rockley, Member of the Permanent Commission, took the Chair at he beginning of the Meeting, but later n it was taken over by Sir Ralph Wedgwood, President of Section I.

The discussion on Summaries 2 to 5 in Ir. Flament's special report was continued.

Mr. Bouteloup asked the English delegates, who use bull-headed rails with leepers which are wider apart than on he majority of the French Railways, hether this type of track does not nable a greater resistance to be offered the dynamic effects resulting from igh speeds, other things being equal.

Mr. Wallace (*London Midland and cottish Railway*) declares that a sleeper pacing of 2 100 per mile is considered ufficient as a general rule, for heavy ads and fast speeds operated at present 22.5 tons per axle and 90 m.p.h.). However, the London Midland and Scottish ailway is now using, as an experiment, 600 sleepers per mile in the hope reducing the maintenance expenses. He did not think that the flat-botommed rail which is also under test on a short section of track, requires a different sleepering from that necessary with bull-headed rails.

Mr. Lemaire asked for the opinion of the P. L. M. Railways with regard to the trial in hand with rails the weight of which had been increased to 62 kgr. per m. (125 lb. per yard), in view of the fact that the majority of the railways in Europe were sticking to rails weighing 45 to 50 kgr. per m. (90.7 to 100.8 lb. per yard).

Moreover, he laid stress on the importance of sieving the ballast, also of making tests with it on delivery, as well as the importance of systematically closing the ashpans of locomotives in order to avoid or delay the clogging of the ballast.

Mr. Desaleux (*Paris-Lyon-Méditerranée Railways*) reported that the use of the 62 kgr. per m. rails laid in 1933 on 25 km. (15.5 miles) of the Paris-Marseilles main line, had been considerably extended on this line, since at present more than 350 km. (217 miles) had been laid with rails of this particular section, and that at the end of the year 1937 they expected to have at last 550 km. (342 miles) of lines laid with it. This extension, declared Mr. Desaleux, was the consequence of the excellent result obtained with this type of rail, both with regard to economy in maintenance and the better behaviour of the track.

Mr. Fraser (*London and North Eastern Railway*) stated that besides the theoretical formulæ, the question of carrying out the maintenance work had to be taken into serious consideration, particularly as regards curves. The education of the permanent-way men, in the first place, and in the second place, the utilization of reference posts for checking the movement of the track, seemed to him to be particularly necessary.

Mr. RIDET (*French Est Railways*) thought that the use of special inspection vehicles was one of the most valuable aids with regard to the maintenance of the track.

The most useful indications to be ascertained, in his opinion, were distortions in the track, the lack of evenness in curves and depressed joints. The passage of the inspection vehicle enabled them to determine which was the best maintenance gang on a particular length, which gang was susceptible of being used to train the less skilled gangs.

Dr. MÜLLER, in turn, replied to Mr. FRASER by giving him the spacings adopted in Germany for the reference posts which consist of pieces of rail set in concrete [100 m. (110 yards) on the straight, about 20 m. (22 yards) on curves, and 10 m. (11 yards) on transition curves].

With regard to maintenance work, two methods were in use, namely : maintenance where visibly necessary, and complete overhaul. In the latter method, not only did they remedy existing defects, but also those defects in process of formation. The complete overhaul was carried out at intervals of 1 to 4 years, according to the importance of the traffic. He was in agreement concerning the use of inspection vehicles, and the necessity of the systematic education of the permanent way staff.

With regard to the rail lengths, he stated that on the German State Railways they had a total length of 11 000 km. (6 875 miles) of track laid with rails 30 m. (98′ 5 1/8″) long, and a total length of 1 000 km. (625 miles) laid with rails of lengths varying between 60 and 2 000 m. (197 and 6 560 ft.). This last length had been laid in a tunnel. But the experience they had thus gained shewed that the costs for the maintenance and the laying of such lengths did not justify their adoption. As regards the future use of long rails, the German State Railways had decided not to go beyond a length of 60 m. for rails to be laid in tunnels.

With regard to the ballast, Dr. MÜLLER was in agreement concerning the necessity of carrying out inspection tests before delivery, which is done in German at the quarry itself and also in a specia laboratory.

The distinction between the differen kinds of ballast was obtained by th adoption of a co-efficient of quality.

Mr. ELLSON (*Southern Railway, Grea Britain*) stated that on his line they ha trains running at 75 to 80 miles per hou on tracks laid on steel sleepers and welded chairs (bull-headed rails) withou anything untoward happening as to th behaviour of the track. He therefor was of the opinion that solely from th point of view of speed, with the exception of lines fitted with track circuitin and electrified lines, the first sentenc in Mr. FLAMENT's Summary 3 appeare to him to be too positive, all the mor because of the increased price of timbe and he thought that the use of ste sleepers could offer special advantages.

After a further exchange of views, th summaries of Mr. FLAMENT's Special R port were adopted, with the followin few alterations :

On Mr. ELLSON's suggestion, the fir

entence in Summary 3 was made to ead thus :

« The wooden sleeper is at present enerally considered as being the most uitable for very high speeds. »

The Section again turned its attention the text which was proposed yesterday y Mr. STOIKA (*Rumanian State Rail- ays*) and after Mr. FLAMENT (*Special eporter)* had spoken, the second sentence Summary 3 was finally completed by e following text : « and in order to ffer a better resistance to the lateral and ertical forces caused by high speeds ».

Similarly, the first sentence in Sum- ary 4 was modified as shown below :

« Increasing the thickness of the layer ballast enables a better distribution to obtained of the loads and vertical rces sustained by the track when ve- cles are passing over it. »

On the suggestion of Mr. LEMAIRE, the cond sentence in Summary 4 was re- aced by the following text :

« The ballast should be sieved, homo- neous and of good permeability... Tests th the ballast before delivery are sirable. »

At the end of Summary 4, the following rding was added :

« In order to avoid the clogging of ballast, it is desirable that the ash- ns of locomotives should be closed. »

On a proposal made by Mr. LEVI and . DESALEUX, the two following sentences re added to the wording of Sum- ry 5 :

« It is desirable to determine by suit- e experiments the limits of speeds which can be readily admitted for the passage of trains through a curve, by taking into account its radius, its superelevation or the insufficiency of this latter. »

« The state of perfection necessary in the maintenance to enable high speeds to be used involves considerable supplementary expenditure, and this expenditure must be taken into consideration when it is proposed to use such high speeds. »

Mr. FLAMENT, however, remarked that the last sentence did not spring from the conclusions in the reports but must be considered as a wish expressed by the Meeting.

— Mr. FLAMENT read *Summary 6 :*

6. The angle of divergence at the point of the blade should be as small as possible; the blade should be flexible, so as to give the track a progressive curvature when entering the switch.

The radius of curvature of the part of the track connecting the switch to the crossing should be as large as possible to guide the vehicle up to the crossing.

All causes of shock or interruption in the running surface and guiding of the axles should be avoided by a careful layout of the whole of the points and crossing and of the two lines of rails.

The crossing angle should be as small as possible and the crossing, like the whole appliance, should be rigid and remain perfectly secure.

The superelevation of the curved parts should be computed in each particular case according to the rules applying to the running road. The speeds to be allowed should be fixed and checked by tests with the various types of vehicles that have to be used.

— Summary 6 was adopted without any modification.

The President then stated that the following summaries had been adopted by the Meeting :

Summaries.

« 1. Except on the Railways in North
« America, where the axle load reaches
« 35 tons, the general limit is 20 tons.
« The tendency of the rolling stock de-
« signers at the present time is to make
« it 20 to 25 tons, according to the Rail-
« ways concerned.

« The speed of 120 km. (75 miles) an
« hour, the usual maximum for a long
« time for passenger trains, has been
« exceeded in many cases. The tendency
« at the present time is to authorise
« maximum speeds of about 150 km. (93
« miles) an hour for ordinary trains,
« and 160 km. (100 miles) an hour for
« railcars and rail motor trains.

« Under these conditions, the track
« stresses will henceforth include an in-
« creasing part due to the dynamic
« effects of the loads moving at high
« speeds. It is desirable, for this reason,
« that these dynamic effects should be
« investigated by means of experiments,
« tests and measurements in all the
« fields in which they may show them-
« selves, both to guide the builders in
« finding suitable ways of balancing and
« distributing the forces, and to appre-
« ciate the stresses the track must be ef-
« fectively able to stand.

« 2. The heavy loads and high speeds
« impose upon the present-day rail me-
« tal a stress which in most cases it
« would be difficult to increase without
« affecting the behaviour and life of
« rails.

« The weight of the rails on the most
« heavily loaded lines in Europe is about
« 50 kgr./m. (100 lb. per yard). There
« are still differences of opinion as to
« the desirability of increasing the
« weight of the rails to meet the increas-
« ing stress resulting from the loads and
« speeds.

« The length of the rails and the type
« of rail joint vary much, according to
« the Railways. The conditions of use o
« extra long rails are still under investi-
« gation and cannot be determined exact-
« ly at present.

« 3. The wooden sleeper is at presen
« generally considered as being the mos
« suitable for very high speeds.

« Increasing the sleepering is one o
« the methods which contribute to th
« strengthening of the track in order t
« enable it to carry the heavier load
« with the least damage, and to offer
« better resistance to the lateral and ve
« tical forces caused by the high speed

« Vehicles running at high speed u
« der satisfactory conditions as regard
« comfort and safety require the trac
« to be perfectly level as well as in goo
« alignment, and correct to gaug
« These conditions can only be fulfille
« if the fastenings securing the rails
« the sleepers are perfectly maintaine
« and tightened up. The use of bearin
« plates between the rails and the sle
« pers, with suitable fastening device
« is the general practice on many ra
« ways, and appears desirable, at least
« those parts of the track which inclu
« curves of small radius.

« 4. Increasing the thickness of t
« layer of ballast enables a better distrib
« tion to be obtained of the loads a
« vertical forces sustained by the tra
« when vehicles are passing over it.

« The ballast should be sieved, hom
« geneous and of good permeability, a
« consist of broken stone, the dime

sions of which should not exceed 6 to 7 cm. (2 3/8″ to 2 3/4″). Tests with the ballast before delivery are desirable.

« The roadbed should be sound and properly drained to prevent water remaining on the ground in cases in which its permeability is known to be poor.

« In order to avoid the clogging of the ballast, it is desirable that the ashpans of locomotives shoud be closed.

« 5. Advantage should be taken of the opportunity offered by track overhaul or renewal work, for modernising old track and obtaining the conditions stated above.

« The alignment and levelling up of the track should be perfect in view of the speeds now run. Curves and their transitions should be very carefully laid, and be maintained and corrected as often as necessary.

« It is desirable to determine, by suitable experiments, the limits of speeds which can be readily admitted for the passage of trains through a curve, by taking into account its radius, its superelevation or the insufficiency of this latter.

« The state of perfection necessary in the maintenance to enable high speeds to be used involves considerable supplementary expenditure, and this expenditure must be taken into consideration when it is proposed to use such high speeds.

« 6. The angle of divergence at the point of the blade should be as small as possible; the blade should be flexible, so as to give the track a progressive curvature when entering the switch.

« The radius of curvature of the part of the track connecting the switch to « the crossing should be as large as pos« sible, to guide the vehicle up to the « crossing.

« All causes of shock or interruption « in the running surface and guiding « of the axles should be avoided by a « careful lay-out of the whole of the « points and crossing and of the two li« nes of rails.

« The crossing angle should be as « small as possible, and the crossing, like « the whole appliance, should be rigid « and remain perfectly secure.

« The super-elevation of the curved « parts should be computed in each par« ticular case, according to the rules ap« plying to the running road. The speeds « to be allowed should be fixed and « checked by tests with the various types « of vehicles that have to be used. »

These summaries were ratified by the Plenary Meeting held on June 7th.

QUESTION II.

Application of welding :

1. To obtain extra-long rails;

2. In manufacturing and repairing points and crossings.

a) *Results obtained by using extra-long rails. Methods used to ensure safe expansion of the rails and anchoring of the track.*

b) *Technical and financial results shown by welding points and crossings.*

Preliminary documents.

Report (Germany, Belgium and Colony, Luxemburg, Netherlands and Colonies, Denmark, Norway, Sweden, Finland, Poland, Austria, Hungary, Switzerland), by Dr.-Ing. MÜLLER. (See *Bulletin*, November 1936, p. 1239, or special issue No. 8.)

Report (Great Britain, Dominions and Colonies, America, China, Japan), by George ELLSON. (See *Bulletin,* January 1937, p. 1, or special issue No. 13.)

Report (France and Colonies, Spain, Portugal and Colonies, Italy, Czechoslovakia, Bulgaria, Rumania, Jugoslavia, Greece, Turkey, Egypt), by J. RIDET. (See *Bulletin,* January 1937, p. 171, or special issue No. 16.)

Supplement to Report (Italy), by J. RIDET. (See *Bulletin,* May 1937, p. 1485.)

Special Reporter : Dr. Ing. MÜLLER (See *Bulletin,* June 1937, p. 1494.)

Report of Section I.

(See *Daily Journal of the session,* No. 5, pp. 2 and 3; No. 6, pp. 1. to 3; No. 9, p. 1.)

Meeting held on June 4th, 1937.

THE PRESIDENT opens the Meeting at 9.30 a.m. and calls upon Dr.-Ing. MÜLLER, who read the résumé appearing in his Special Report, and afterwards put the following question to the Delegates :

« Does the Belgian National Light Railways Company intend to continue to weld fish-plates by electric fillet welding, in spite of the large number of broken rails (15 %) » ?

Mr. VALCKE (*Belgian National Light Railways Co.*), stated that if, at first, about ten years ago, the number of broken rails was a high as 15 %, this figure had been reduced, during the course of the last three years, to 4.5 %. The present process consisted in welding the fish-plates on old re-used rails, and these rails had a bed plate placed under the flanges.

Mr. VALCKE wished to make it clear th the damage did not refer to breakag but rather to local loosening of the we ding fillets, and the cost of repairi these was not very high. It is well t intention of the Belgian National Lig Railways Company to extend this pra tice of using welded joints [with ra of 23 kgr. per m. (46.4 lb. per yar 25, 30 and 40 years old].

Dr. Ing. MÜLLER stated that the G man State Railways were also carryi out welding, but on old rails only. regards new rails, the rolling mills we now supplying lengths of 30 to 60 (98' 5 1/8" to 196' 10 1/4"), which we to be adopted in future in Germany, a which dit not call for subsequent w ding.

On the old rails, of variable lengt the worn-out ends were cut off and t recent practice had been to use unifo lengths of 20 m. (65' 7 3/8"). Th welded rails were set aside for lines secondary importance, whilst the 30 60 m. rails were laid on the main li

Mr. RIDET (*Reporter*) stated that France welding had also been applied worn-out rails. The rails, which generally 12 m. (39' 4 1/2") long, h pieces 50 cm. (19 11/16")long cut each end, and the lengths of rail wh remain (11 m. = 36' 1"), are wel together, giving rails 22 m. (72' 2") lo These latter are annealed, and the qua of their metal becomes superior to tha the original rails which had been f gued by the passage of trains.

Mr. LEMAIRE (*Belgian National R ways Co.*) stated he was glad to state was in agreement with the opinion pressed by the German and French D gates. On the Belgian National Railw

Co.'s lines, the rails are rolled in 27-m. (88' 7"), lengths welded together in order to form new rails each 54 m. (177' 2") long (Brussels-Antwerp electrified line). As regards the worn-out rails, these, in one particular case being rails 9 m. (29′ 6 3/8″) long (Bessemer steel dating from 1879), had been made by welding four lengths together to form 35-m. (114′ 10″) lengths. The Belgian Railways were also annealing their rails after welding, and were carrying out metallographic and bend tests, which had proved that electric resistance welding was superior to the thermit process.

Mr. Lemaire then drew attention to a trial which had been carried out with a type of joint which consisted of sawing a rail 18 m. (59' 5/8") long in two, and of placing the joint in the middle, so as to obtain two spaces for holding the fishplates which are exactly identical. The two half-lengths are, naturally, welded together at their ends in order to form rails of the desired length. This trial had given very satisfactory results, and the use of this « ideal » joint will be developed.

Mr. Cooper (*London Passenger Trans-*
ort Board) then dealt with the question
f the expansion of extra-long rails. He
ad had experience of rails 240 ft.
72 m.) long and had noticed that the
ıly effects observable, due to tempera-
ıre variations, were found at the ends
' the rails, without any deformation of
e track. Even for extra-long rail
ngths, an ordinary joint gap was in his
pinion sufficient. On a well-maintained
ack, the internal stresses in the rails
re sufficient to take up those resulting
om expansion. Under these conditions,
r. Cooper wanted to know if it was not
orth while considering very long lengths of rail, as has already been done on certain American Railways.

The other question put by Mr. Cooper related to the factor of safety which should be demanded from a welded joint. In England, he declared, the impact test was the one preferred. Continental countries, on the contrary, seemed to prefer the bending test for welded joints. The question of really adequate tests, calculated to give an effective guarantee, seemed worthy of being gone into more closely.

Finally, Mr. Cooper stated that, within his knowledge, the Delaware and Hudson Railroad were using a machine which enabled them to carry out resistance welding on the site. He was also of the opinion that the electric resistance welding process gave the best results.

Dr. Müller replied to Mr. Cooper by giving the results of the trials carried out systematically at Karlsruhe, on a running road, with different types of sleepers, made of wood and steel, with rails weighing 49 kgr. per m. (98.8 lb. per yard), and ballast composed of broken basalt, and with a sleepering of 1 600 per km. (2 575 sleepers per mile).

These trials consisted in heating up the rail until deformations in the track appeared, the track at the same time being used under various kinds of traffic. On the straight, no deformation appeared until a temperature of 180° C. (356° F.) was reached, and in a curve of 500 m. (25 chains) radius until a temperature of 130° C. (266° F.) had been reached. These trials, therefore, only went to prove that the statements made by Mr. Cooper were well founded.

With regard to the maximum length of rails to be adopted, the German State Railways had now fixed it at 60 m.

(196' 10") particularly on account of the fact that very high speeds gave rise to continuous oscillations in the rolling stock, and the passage of the trains over the joints had the effect of avoiding the resonance of the oscillations.

Mohamed Kamal EL KHISHIN Bey (*Egyptian State Railways*) reported that two years ago a suburban line in Egypt had been welded over a length of one kilometre (0.62 mile). At the ends, special expansion joints had been fitted, and the gap fixed at 50 mm. (1 31/32"). It was noticed that this gap had never closed up to less than 40 mm. (1 37/64") and that, on the whole, the behaviour of the track and the riding of the vehicles had always been excellent (rails 12 m. (39' 4 1/2") long laid on steel sleepers).

Mr. STOIKA (*Rumanian State Railways*) reported that a thermit welding trial had been carried out in a tunnel (with a down gradient of 1 in 50) over a length of 1 kilometre. In the tunnel, the total variation in temperature was 50° C. (90° F.) at the ends, and 20° C. (36° F.) in the middle. Although the work seemed to have been properly carried out, 15 breakages had occurred in a total of 150 joints, in the neighbourhood of the joints. A change in the grain of the metal had also been noticed, as well as a decrease of about 25 % in the resistance of the metal.

Dr.-Ing. MÜLLER stated that for a number of years the German statistics had shown that the proportion of breakages was 1.5 per thousand for joints welded by the thermit process, and 0.2 per thousand as regards joints welded by the resistance process (average figure less than 1 per thousand reckoned over 1 000 000 welded joints). He therefore thought that the breakages reported Mr. STOIKA must have been accidental.

Mr. STEHLICK (*Jugoslav State Railway* stated he agreed with Dr.-Ing. MÜLL and reported that a welded length 1 200 m. (0.75 mile) on a curve and steep down gradient in a tunnel, carri out in 1933 by the thermit process, h not given rise to a single breakage crack (rails weighting 45 kgr. per = 90.7 lb. per yard — wooden sleeper

Dr.-Ing. MÜLLER asked if the Delega thought that heat treatment was necess after welding. Mr. COOPER's opinion that it was perhaps necessary in cert cases. Mr. RIDET stated that the tri which had been carried out showed t the heat treatment improved the qua of the weld and the homogeneity of metal, and diminished the grain of latter. This heat treatment, moreo had the merit of being inexpensive. agreed, however, that the thermit pro very often gave satisfactory results, w out using any heat treatment.

Dr.-Ing. MÜLLER expressed his ag ment with Mr. RIDET.

The Meeting then examined the posed summaries.

Summary 1 :

1. The application of welding to t equipment, which only dates back a 6 years, has not only given rise, in of its recent introduction, to cons tional progress, but, as shown by results obtained so far, has been means of effecting appreciable sav in the first cost and maintenance of the track.

The chief advantage of welding is the number of rail joints can be mar ly reduced, and that the joints can be entirely eliminated on long lengths.

It is desirable hat studies and experinents be carried on in connection with he behaviour of extra-long welded rails nder the rolling loads, as well as the idth of the joint gap with different engths, at different rail temperatures. irst of all, the exact causes of track eformations, which sometimes occur, hould be investigated.

On other hand, not only is smooth nd comfortable riding obtained by the se of extra-long rails, but there is also ess wear and tear of the rolling stock. onsequently savings in the first cost nd maintenance of rolling stock may be xpected, such savings being the larger he longer the section of line laid with ong rails.

As suggested by Mr. Ridet, the followng three paragraphs are inserted :

Moreover, welding enables composite ails to be constituted by welding together two rails of different profiles, hich is an excellent means of abolishng special fish-plates, which fish-plates ften are a cause of dislocation.

On bridges, the welding of the joints ppreciably diminishes the dynamic ffects, which contributes to the preervation of the whole of the different arts of the structure.

Similarly, the use of welded rails hould be considered for heavily loaded nes in marshalling yards when the allast and side-ballast are compact nd well knitted together, as the risks f transverse deformation are thus ery much reduced.

The wording given on page 1889 was nally adopted.

— The Meeting was then closed.

Meeting held on June 8th, 1937.

The President read the further addion which Mr. Ridet *(Reporter)* proposl to the end of Summary No. 1, as ollows :

« It is desirable that the welding of rails should be checked during execution, by means of suitable tests (mechanical and metallographic). »

This addition was adopted.

Summary 2 :

2. By the use of welding for assembling and fastening rails and other track components, particularly when fabricating points and crossings, it is possible to reduce the number of fastenings subject to heavy wear. The resistance to wear and the life of points and crossings will be increased thereby.

Before Summary No. 2 was put to the vote, an exchange of views took place with regard to the respective advantages and various features appertaining to the use of wooden and steel sleepers.

Dr.-Ing. Müller *(Special Reporter)* stated that on the German State Railways it was a current practice to recondition steel sleepers by cutting out the middle portions, which are afterwards welded together in order to form new sleepers which are found to be as strong as new.

As regards the life of steel sleepers, this is 30 to 40 years, where conditions are favourable. On the contrary, where the atmosphere is wet or acid ,particularly in the neighbourhood of chemical works, for example in the Ruhr, this life may be reduced to 12 or even 8 years. Since the German State Railways have been able to establish the facts just mentioned, they have reversed the arrangements they formerly had in force, i. e. they are employing steel sleepers in Pomerania where the climate is favourable, and wooden sleepers in the Ruhr.

As regards the speeds to be authorised for running over steel sleepers, Dr.-Ing. Müller did not think that their resistance was of such a nature as to impose any restriction. Mohamed Kamal EL KHISHIN Bey was of the same opinion on this latter point.

Coming to the welding processes employed, Dr.-Ing. MÜLLER, replying to a question put by Mr. ANDRZEJEWSKI (*Polish State Railways*), stated that the thermit process was used on the line and the resistance process in the workshops. Regarding the cost, he thought that the two processes were comparable, the second being more economical, but involved rather high expenditure for transport, as well as for taking up and relaying the rails.

On the subject of the lengths of rails used, Dr.-Ing. MÜLLER confirmed that on the German State Railways, the rule was to use rails 60 m. long in tunnels, 30 m. long in the open, and that, in addition, trials were in hand to ascertain if lengths of 60 m. could be used as a current practice in the open.

— Summary 2 was unanimously adopted.

Summary 3 :

3. Building up by welding is a means of reconditioning the worn running surfaces and consequently of again lengthening the life of rails and crossing noses.

Mr. ELLSON (*Reporter*) communicated some important information respecting the building up of worn crossings by welding. For the last then years, his System (Southern Railway, England) had only been able to properly maintain their crossings, on the electrified lines where the intensity of the traffic has increased by 150 %, by welding. At present, they have 18 500 crossings which have been repaired in this way, and this work
being continued at the rate of 3 000
4 000 per year, and considerable main
nance savings have thus been obtain
It is the electric arc welding process
preference to the oxy-acetylene proce
which has only been used for ab
100 crossings) which has proved its
to be the most satisfactory, by reas
particularly of the rapidity with whi
the work can be carried out on runni
lines carrying very heavy traffic.

The packing up of the track and
bolting up are very important before
welding work begins. Moreover, the c
tour of the built-up part must be adapt
to the local conditions of wear, whi
vary in different districts. Grindi
after welding is the practice follow
by the Southern Railway. During fros
weather, the work is suspended. Pr
heating of the part to be welded is carri
out by means of heating elements f
with current used for running the trai
on the electrified lines, or with curre
supplied by the welding plant.

Mr. ELLSON thought that, in any ca
it was considerably more advantageous
carry out the building-up by welding
situ rather than remove and relay t
crossings.

— Summary No. 3 was adopted in
slightly modified form, the words « ru
ning surfaces worn locally » being subs
tuted for « the worn running surfaces
and the word « noses » at the end bei
replaced by « components ».

Summary 4 :

4. This results in still further sa
ings on the capital cost and maintenan
costs of the track as a whole.

As regards the various welding pr
cesses, which are still in the experiment

stage, an endeavour is made, by means of observations, studies and experiments, to find out, for each kind of weld, which process is the best from the double point of view of quality and economy. The results obtained in a short time are so promising that it is proposed everywhere to still further extend the use of welding in track work. There is every hope that future progress in this still new field, will prove beneficial for the Railways and their respective countries.

Mr. ELLSON proposes to alter the first sentence as follows : « This results in substantial savings on the maintenance costs of the track and avoids interference with traffic working. »

— Summary 4 was adopted with this modification.

THE PRESIDENT then stated that the summaries had been adopted with the following wording :

Summaries.

« 1. The application of welding processes to track equipment in order to increase the length of rails hardly dates back more than six years. In spite of its recent introduction, welding has not only given rise to progress in track construction, but also to appreciable savings in the expenditure necessary for laying and maintaining the track.

« The chief advantage conferred by welding is that rail joints can be appreciably reduced in number, or even entirely eliminated on long track lengths. Moreover, welding enables composite rails to be constituted by welding together two rails of different profiles, which is an excellent means of abolishing special fish-plates, which fish-plates often are a cause of dislocation.

« It is desirable that studies and experiments should continue to be carried out with regard to the behaviour of long welded rails on running lines, under the heavy rolling loads, as well as to the width of the joint gap with different lengths of rail and different temperatures.

« Moreover, the use of extra-long rails not only ensures smooth and comfortable riding of the vehicles, but such vehicles are also subject to lesser fatigue.

« On bridges, the welding of the joints appreciably diminishes the dynamic effects, which contributes to the preservation of the whole of the different parts of the structure.

« Savings may therefore be looked for in the expenditure necessary for maintaining and building vehicles and bridges, economies which will be all the more appreciable on those sections of line where the longest lengths of track are laid with long rails.

« Similarly, the use of welded rails should be considered for heavily loaded lines in marshalling yards when the ballast and side-ballast are compact and well knitted together, as the risks of transverse deformation are thus very much reduced.

« It is desirable that the welding of rails should be checked during execution, by means of suitable tests (mechanical and metallographic).

« 2. By the use of welding for joining rails and other track components, particularly when fabricating points and crossings, it is possible to reduce the number of fastenings subject to heavy wear. The resistance to wear and the

« life of points and crossings will be « increased thereby.

« 3. Building up by welding is a means « of reconditioning running surfaces « worn locally, and consequently of again « lengthening the life of rails and cross« ing components.

« 4. This results in substantial savings « on the maintenance costs of the track « and avoids interference with traffic « working.

« As regards the various welding pro« cesses, which are still in the expe« rimental stage, an endeavour is made, « by means of observations, studies and « experiments, to find out, for each « kind of weld, which process is the « best from the double point of view of « quality and economy. The results ob« tained in a short time are so promising « that it is proposed everywhere to still « further extend the use of welding in « track work. There is every hope that « future progress in this still new field « will prove beneficial for the railways « and their respective countries. »

— The Plenary Meeting held on June 11th ratified the above summaries.

QUESTION III.

Methodical and periodical maintenance of :

1. metal bridges; 2. signals; 3. metal supports carrying the contact wire on electric railways.

Organisation. — Working methods Materials used.

Preliminary documents.

Report (Great Britain, Dominions and Colonies, America, China and Japan), by Wm. A. FRASER. (See *Bulletin*, Septem ber 1936, p. 875, or special issue No. 1.

Report (Netherlands and Colonies, Ger many, Belgium and Colony, Luxemburg Denmark, Norway, Sweden, Finland, Po land, Austria, Hungary, Switzerland), b Th. W. MUNDT. (See *Bulletin*, March 193 p. 775, or special issue No. 24.)

Report (Bulgaria, Egypt, Spain, Franc and Colonies, Greece, Italy, Portugal an Colonies, Rumania, Czechoslovakia, Tu key and Jugoslavia), by V. DEGREEF. (Se *Bulletin*, May 1937, p. 1245, or speci issue No. 34.)

Special Reporter : Th. W. MUNDT. (Se *Bulletin*, June 1937, p. 1505.)

Report of Section I.

(See *Daily Journal of the Sessio* No. 7, pp. 1 and 2; No. 8, p. 1; No. 9, p. 1

Meeting held on June 9th, 1937.

THE PRESIDENT opened the Meeting 9.30 a.m. and stated that the three Repo ters had drawn up new summaries whi differed slightly from those printed the end of the *Special Report*.

THE PRESIDENT then called upon M MUNDT (*Special Reporter*) who first all thanked the Reporters, Messrs. FRAS and DE GREEF, and recalled that Mr. GREEF had had to take the place, at sh notice, of Mr. MENDOZA, the Spanish porter who had been previously non nated.

The Section then began examining t new summaries.

Summary 1 :

1. It is advisable that the staff r ponsible for the design and constructi

f metal bridges should directly or indirectly intervene in the maintenance of uch structures.

— Adopted.

Summary 2 :

2. Depending on the size of the bridge, he use of pneumatic or electric de-rustng apparatus will reduce maintenance osts.

— Adopted with a slight modification, s follows : « ...will, in certain cases, educe », instead of « ...will reduce... ».

Summary 3 :

3. When periodical re-painting is ndertaken, it is sometimes unnecesary to treat large surfaces which are till in a good state of preservation, n the same manner as necessary for ther surfaces, unless æsthetic coniderations require it; in such a case it hould be sufficient to apply only the nal coat.

— Adopted.

Summary 4 :

4. With a view to avoiding the conngency of removing scaffolding, it is dvisable to apply a binding material hich makes it possible to apply the ollowing coat of paint soon after the revious coat is put on.

— Adopted.

Summary 5 :

5. The use of spray-painting can, in any cases, enable a saving in the re-ainting of bridges to be effected.

Mr. Ridet (*French Est Railways*) proosed to say : « ...in certain cases... » nstead of « ...in many cases... ».

— This modification was adopted, and the expression « re-painting » was also replaced by « painting », as proposed by Mr. Mundt.

Summary 6 :

6. Derusting work and the application of red lead and other paint should be carried out by the Railway's own staff, in preference to contracting out this work.

Certain Delegates thought that it was specially important to have the de-rusting of bridges carried out by the railway's own staff, by reason of the care this operation demanded if it was to be properly carried out.

On the contrary, Mr. Desaleux (*P. L. M. Railways*) stated that on his line the work in question had been done by contractors, and done satisfactorily.

— This summary was altered so as to take into account the remarks made.

Summary 7 :

7. Complete removal of mill scale, followed immediately by the application of a priming coat, reduces the danger of corrosion beneath the paint in the case of new structures, and is conducive to savings in maintenance painting work.

— This clause was deleted.

Summary 8 :

8. In view of the increased train speeds it is advisable, in order to ensure better preservation of old bridges, to use rails assembled by welding in order to avoid joints.

Replying to Mr. Lemaire (*Belgian National Railways Co.*) Mr. Lévy (*French State Railways*) in connection with the use of rubber, with a view to reducing the maintenance costs of bridges, gave particulars of the practice on his System, which went back about five years, and consisted in using rubber bearings instead of those made of lead, which resulted in a diminution of the maintenance costs and avoided the dislocation of the various parts of the bridges.

Moreover, rubber plates have been fitted under the longitudinal stringers to take up the shocks on the structure; these plates at the same time reduce the vibrations and noise.

— Summary 8 is adopted, the word « old » being, however, deleted.

Summary 9 :

9. At the extremities of movable bridges, it is advisable to provide rail joints not giving rise to shocks.

— This clause is adopted in a modified form.

Summary 10 :

10. Savings can be effected in many instances by the use of electric welding for repairing and strengthening bridges.

Mr. LEMAIRE proposed to add « ...and interference with the running of the traffic avoided... ».

— Adopted with this modification.

Summary 11 :

11. The lower flanges of girders subjected to engine chimney blast can be efficaciously protected by means of reinforced concrete.

Several Delegates reported that the protection, by means of reinforced concrete, of bridges girders exposed to locomotives fumes demanded very great care in fixing, if it was to be really efficient.

Mr. RIDET thought that a thickness of concrete casing of 3 cm. (1 3/16") should be laid down.

Mr. LEMAIRE reported that on his System they had been using reinforced concrete for protecting steel bridges for more than twenty years, with satisfactory results, and this, in his opinion, proved the value of such protection.

— This summary was slightly amended and adopted as the new No. 10 hereafter

Summary 12 :

12. It appears advisable to appoint a special Division or Section for maintaining signal apparatus and all telegraphic and telephonic means of communication.

At the request of Mr. BOUND (*Londo Midland and Scottish Railway*) this claus was slightly amended and adopted a No. 11.

Summary 13 :

13. It is desirable to use the mos skilled employees in the signalling services, the question of seniority bein considered as of secondary importanc

— Following an intervention by Mr DRIESSEN (*Netherlands Railways*), th summary was deleted.

Summary 14 :

14. Periodical checking of the lum nosity of signals does not appear be necessary, as a rule; the reports the locomotive running department sta are sufficient for pointing out any d fects of signals.

Mr. BOUND stated that his System co trarily to the general practice, periodica ly checked the luminosity of electric si als, and made a particular point of hecking the focussing of the lights.

— The wording of Summary 14 was lightly amended (No. 12 hereafter).

Summary 15 :

15. It is desirable that maintenance taff responsible for checking the de-ector slide clearance use a special auge.

— Adopted (became No. 13).

Summary 16 :

16. It is as a rule advisable to slightly nderrun signal lamps.

Mr. RIDET stated that on his Railway ey had considerably reduced the phan-om effect in lamps by adopting pear-haped lamps instead of spherical bulbs.

— Adopted (as No. 14).

Summary 17 :

17. Rigid point rodding consisting of ibes or rolled sections have, as com-ared to double galvanised wires, the rawback of requiring repainting at re-lar intervals.

— After an exchange of views between essrs. LANG *(Alsace-Lorraine Railways)*, UNDT and LEMAIRE, it was decided to lete this clause.

Summary 18 :

18. The use of enamelled iron signal ms is in the long run more economical.

— Adopted (became No. 15).

Summary 19 :

19. It appears unnecessary to remove ack circuit relays for overhaul in the workshops at regular intervals, if well trained staff are available, who can examine them in situ.

Mr. BOUND stated that his System, unlike the majority of the other Administrations, carried out a systematic examination of the track-circuit relays on the main lines.

— This summary was adopted after being slightly amended.

— The Meeting was then closed.

Meeting held on June 10th, 1937.

Mr. HASHIGUCHI, *Vice-President* of Section I, opened the meeting by calling upon Mr. MUNDT (*Special Reporter*) who submitted to the Section the remainder of the proposed summaries.

Summary 20 :

20. With a view to eliminating or reducing re-painting of supports carrying the overhead contact wires, it appears that complete galvanisation of the supports gives the best results.

— Adopted without discussion.

Summary 21 :

21. Metal spraying of supports carrying contact wires does not always provide sufficient protection against rusting of steel parts.

Mr. EGGENBERGER (*Swiss Federal Railways*) reported that on his System the metallisation of overhead wire supports had been carried out by spraying, on account of the brackets which were rivetted to the supports. In order to fill up the pores and rough places in the surface of the metal, an additional coat of linseed oil paint had been applied with satisfactory results.

— This summary was adopted with an additional sentence taking into account the above statement (No. 18 of the new summaries).

Summary 22 :

22. The use of supports consisting of rolled sections with wide flanges, to which tie-rods or brackets are fixed, lowers the initial cost as well as maintenance costs.

— As proposed by Mr. BALLING (*Paris-Orléans Railways*) this wording was slightly amended, and became summary No. 19, reproduced hereafter.

Mr. HASHIGUCHI (*Vice-President*), after stating that the programme of the Section had been exhausted, expressed thanks to all the Delegates and declared the Meeting closed, after Mr. LEMAIRE had also thanked, on behalf of the Meeting, the Bureau of the Section.

The complete text of the summaries adopted by the Section is as follows.

Summaries.

« 1. It is advisable that the staff responsible for the design and construction of metal bridges should directly or indirectly intervene in the maintenance of such structures.

« 2. Depending on the size of the bridge, the use of pneumatic or electric de-rusting apparatus will, in certain cases, reduce maintenance costs.

« 3. When periodical re-painting is undertaken, it is sometimes unnecessary to treat large surfaces which are still in a good state of preservation, in the same manner as necessary for other surfaces, unless æsthetic considerations require it; in such a case it should be sufficient to apply only the final coat.

« 4. With a view to avoiding the contingency of removing scaffolding, i is advisable to apply a binding material which makes it possible to appl the following coat of paint soon afte the previous coat is put on.

« 5. The use of spray-painting can in certain cases, enable a saving i the re-painting of bridges to be effected.

« 6. De-rusting work and the application of red lead and other pain carried out by the Railway's own staf may offer advantages from the poi of view of the quality of the wor as compared with the work execute by contractors.

« 7. In view of the increased trai speeds, it is advisable, in order ensure better preservation of bridge to use rails assembled by welding i order to avoid joints.

« 8. At the ends of movable bridge it is advisable to provide arrangemen not giving rise to shocks from the pa sage of trains.

« 9. Savings can be effected in ma instances, and interference with th running of the traffic avoided, by t use of electric welding for repairi and strengthening bridges.

« 10. The flanges of girders subject to engine chimney blast can, in ce tain cases, be protected by means reinforced concrete.

« 11. It appears advisable to appoi a special division or section for mai taining signal apparatus, together wi all telegraphic and telephonic mea of communication.

« 12. Periodical checking of the luminosity of signals is not thought to be necessary by all Administrations; the reports of the locomotive running department staff are considered, from their point of view, sufficient for pointing out defects of signals.

« 13. It is desirable that maintenance staff responsible for checking the detector slide clearance use a special gauge.

« 14. It is, as a rule, advisable, to slightly under-run signal lamps.

« 15. The use of enamelled iron signal arms is, in the long run, more economical.

« 16. It appears unnecessary to remove track circuit relays for periodical examination if well-trained staff are available who can examine them in situ without any interruption of the traffic.

« 17. With a view to eliminating or reducing re-painting of supports carrying the overhead contact wires, it appears that complete galvanisation of the supports gives the best results.

« 18. Metal spraying of supports carrying contact wires does not always provide sufficient protection against rusting of steel parts.

« As a precautionary measure, a final coat of linseed oil paint should be applied, in order to fill up any pores which may have been left as the result of the metal spraying.

« 19. The use of supports consisting of rolled sections with wide flanges which have the tie-rods or brackets clamped instead of being bolted or rivetted, lowers the initial, as well as the maintenance costs in the majority of cases. »

— These summaries were ratified by the Plenary Meeting held on June 11th.

2nd SECTION. — Locomotives and rolling stock.

President : Prof. Dr.-Ing. W. Wechmann.
Vice-Presidents : P. Koller, W. Hupkes, O. Storsand and O. H. Munck.
Principal Secretary : A. W. Chantrell.

QUESTION IV.

Evolution of the rail motor car as regards its construction, and special investigation into the transmission and brake questions. Comparative methods of testing railcars. Detailed investigation into the cost of railcars and methods of reducing them.

Preliminary documents.

Report (North and South America, China and Japan), by E. Wanamaker. (See *Bulletin*, April 1937, p. 857, or special issue No. 26.)

Report (Germany, Austria, Bulgaria, Denmark, Egypt, Finland, Greece, Hungary, Norway, Poland, Rumania, Sweden, Switzerland, Czechoslovakia, Turkey, Jugoslavia), by Herr Stroebe. (See *Bulletin*, May 1937, p. 1281, or special issue No. 35.)

Report (Belgium and Colony, Spain, France and Colonies, Great Britain, Dominions and Colonies, Italy, Luxemburg, Netherlands and Colonies, Portugal), by L. Dumas and J. Lévy. (See *Bulletin*, May 1937, p. 1363, or special issue No. 36).

Special Reporter : L. Dumas. (See *Bulletin*, June 1937, p. 1521, or special issue.)

Report of Sections II and III meeting jointly.

(See *Daily Journal of the Session*, No. 2, pp. 3 and 4; No. 3, pp. 3 to 5; No. 5, p. 1.)

Meeting held on June 2nd, 1937.

The President calls upon Mr. Dum
(Special Reporter).

Mr. Dumas, summed up the chapt
« General » of his special report, ar
read Summary No. 1.

1. Satisfactory technical solutions ha
been found in the course of the last tw
of three years to the speed, acceleratio
braking and safety problems.
The future of the railcar now depen
on the solutions that will be adopted
regards comfort, economical maintena
ce and capacity. This future also d
pends on future improvements of t
track (curves, superelevation, elimin
tion of rail joints or reduction of the
number), and on the adaptation of t
operating methods to the rail motor ca

Mr. Le Besnerais *(French Nord Ra
way)* asked that the question of mutu
adaptation of railcars and methods
operation should be discussed, and th
the Delegates should communicate the r
sults of their experience.

Mr. Renevey *(Algerian Railways)* st
ed he would like first of all that t
term « autorails » (railcar) should
defined. It seemed to him that it w
somewhat of an exaggeration to apply t
term to what are really trains of mo
vehicles and trailers.

Mohamed Sakr Effendi *(Egyptian St
Railways)* desired information regardi

the number of breakdowns or damages per 100 000 kilometres run, as compared with steam trains.

Dr. Ing. Leibbrand *(Deutsche Reichsbahn)* emphasised the success which had been achieved from all points of view by the frquent substitution of railcar services, notably in the densely populated region of the Ruhr, for the heavy trains drawn by locomotives.

With regard to long-distance traffic, the operation of fast railcars (Schnelltriebwagen) must be considered as a provisional solution only; this traffic would be served ultimately by high-speed locomotives with heavy trains, the triple railcar sets being utilised for complementary services.

The railcar constitutes, furthermore, an excellent means of transport for less densely populated areas.

Mr. Lévy *(Reporter)* gave information on the methods of utilising railcars on the French State Railways. In order to deal with traffic at certain times, it has been found necessary to couple together several units, and satisfactory results have been obtained.

In reply to the point of view expressed by Mr. Renevey, it is an essential characteristic of railcars that several units, self-propelled or not, can be coupled together.

Mr. Koller *(Vice President)* gave information on the operation of railcars having one or two trailers, used on the Czechoslovak Railways.

Mr. Barata *(Portuguese Railways Company)* asked Mr. Lévy for information on the use of railcars as traffic collectors for steam trains.

Mr. Hupkes *(Vice-President)* pointed out the results which had been obtained on the Netherlands Railways with their triple railcar sets which are sometimes coupled together to form trains of up to twelve vehicles.

Mr. Dumas summarised the remarks made by the preceding speakers, and proposed the discussion of Summary No. 1.

Mr. Palmieri *(Italian State Railways)* gave the Members of the Section information regarding the use of railcars on the Italian Railways. He spoke of the introduction of electric (multiple-unit) trains designed to work at speeds of 160 kilometres per hour.

Mr. Nicolet *(French State Railways)* whilst in agreement with the general principles included in the summary, wished that the problem of railcar operation should be emphasised.

Mr. Renard *(French Est Railways)* stated that it would be as well to adopt the clause as worded, in order not to depart from the question; he would like, however, to point out that it is necessary to adapt the railcar characteristics and methods of operation to the needs of the public.

Mr. Matter *(Swiss Federal Railways)* agreed with this point of view.

Mr. Day *(South African Railways and Harbours)* pointed out the various difficulties which are met with in the operation of railcars in South Africa.

Mr. Dumas, in order to take into consideration the remarks made, proposed to complete Summary 1 as follows : « and especially on the mutual adaptation of railcars and methods of operation ».

— Adopted.

Mr. Dumas then read Summaries Nos. 2 and 3.

2. Railcar diesel engines can be divided into three classes :

(*a*) 600 to 1 800-h.p. engines, relatively heavy, but very economical as regards working and maintenance; such engines are used extensively in the United States of America;

(*b*) 300 to 600-h.p. engines weighing about 5 kgr. (11 lb.) per h.p., as adopted by most European Railways;

(*c*) 200 to 300-h.p. engines, amongst which the Czechoslovak, German and French horizontal engines deserve special mention.

By the use of supercharging, which tends to extend, the weight/power ratio of engines can be reduced; improved behaviour of the motion and better dissipation of the lost heat units are also obtained.

3. Mechanical transmissions are quite satisfactory, as regards weight, cost and efficiency, up to 300 h.p. Mechanical transmissions for 450 and 500 h.p. are being tested in Italy and in France.

Electrical transmissions are now fully perfected for all powers, and are preferred for services on mountain lines and for multiple-unit working.

Hydraulic transmissions have made definite progress in the course of the last two years, in respect of all powers and engine speeds, in Austria and Germany.

Mr. Renevey stated that, whilst he was in agreement with the summaries generally, he did not believe that one could really say that there were engines of 1 800 h.p. for railcars.

Mr. Dumas disagreed with Mr. Renevey and stated, as an example, that the Winton engines of 1 800 h.p. had been specially designed for railcars. They were characterised by their lightness and their high power/weight ratio; they had noth ing in common with diesel engines fo locomotives.

Mr. Dreyfus *(Midi Railways, France* asked if one could not call « autorail all motor-vehicles used for the transpor of passengers.

Mohamed Sakr Effendi stated that, i the summaries, mention might have bee made of the steam railcar.

Mr. Stroebe *(Reporter)* expressed th opinion that the construction of the v hicle rather than the power of the engi was the determining factor.

Mr. Le Besnerais wished to obtain i formation on the efficiency of the diff rent types of transmissions, and the d fects which have arisen with them service.

Mr. Dumas gave information on th subject.

Mr. Stroebe gave details relative to t hydraulic type of transmission whi has, however, been put into service mu too recently for definite conclusions be expressed. This type of transmissi allows, in particular of coupling up wi vehicles having electric transmissio This type of transmission also off special advantages from the point view of braking.

Mr. Le Besnerais thanked Mr. Stroe and reported the trial on the Fren Nord of a fourth type of transmissio by air (by means of a propeller devic which might perhaps be a new soluti of the braking problem.

Mr. Leiner *Czechoslovak State Ra ways)* drew attention to the good resu which had been obtained in Czechoslo kia with the combined electrical and mechanical transmission.

An exchange of views took place between Messrs. NICOLET, DUMAS and PONCET *(French Est Railways)* on the subject of the second paragraph of Summary 3 (electrical transmissions).

Mr. VAN SCHOUWENBURG *(Dutch Indies Railways Company)* asked Mr. STROEBE if the mechanical part of the transmission would not become too complicated if it were also used in connection with the braking, and if the maintenance costs would not be increased.

Mr. STROEBE could not yet give any information as to the cost of upkeep, but the results had been favourable. A special device would appear to be necessary, but should not result in any complication of the transmission.

Mr. DUMAS, then gave the modifications he proposed to make to the summaries in order to take into account the remarks made.

On the proposition of the President, the following summaries were adopted :

« 1. Satisfactory technical solutions have been found in the course of the last two or three years to the speed, acceleration, braking and safety problems.

« The future of the railcar now depends on the solutions that will be adopted as regards comfort, economical maintenance and capacity. This future also depends on future improvements of the track (curves, superelevation, elimination of rail joints or reduction of their number), and especially on the mutual adaptation of the rail motor car and operating methods.

« 2. Railcar diesel engines can be divided into three classes :

« *a)* 600-H.P., and over, engines, relatively heavy, but very economical as regards working and maintenance; such engines are used extensively in the United States of America;

« *(b)* 300 to 600-H.P. engines weighing about 5 kgr. (11 lb.) per H.P., as adopted by most European Railways;

« *(c)* Up to 300-H.P. engines, amongst which the Czechoslovak, German and French horizontal engines deserve special mention.

« By the use of supercharging, which tends to extend, the weight/power ratio of engines can be reduced; improved behaviour of the motion and better dissipation of the lost heat units are also obtained.

« 3. Mechanical transmissions are quite satisfactory, as regards weight, cost and efficiency, up to 300-H.P., and allow the coupling up of two or three vehicles. Mechanical transmissions for 450 and 500-H.P. are being tested in Italy and in France.

« Electrical transmissions are now fully perfected for all powers, giving full satisfaction for services on mountain lines and for multiple-unit working.

« Hydraulic transmissions have made definite progress in the course of the last two years, in respect of all powers and engine speeds, in Austria and Germany; they also allow of multiple-unit operation, even when coupled up to electrical-transmission units. »

— The Meeting was closed at 1.0 p.m.

Meeting held on June 3rd, 1937.

The PRESIDENT opened the Meeting at 9.30 a.m., and called upon Mr. DUMAS

(Special Reporter), who read Summary No. 4 :

4. In order to reduce to a minimum the vertical movement of bogies, and to improve comfort, Railways are now using wheel tyres coned 1/40, cylindrical tyres, multiple suspension gear and rubber shock absorbers. Such devices have not given rise to any difficulty, and their use can be recommended.

Some Administrations also use devices to damp out hunting movements and vertical vibrations, bogies (articulated or not) with six or eight wheels, loose wheels revolving on fixed axles, axleboxes without axleguards, etc. All these solutions have given them satisfaction.

Mr. Dumas proposed to add the following paragraph to this summary :

« All Administrations are adapting the suspension of their railcars to the permanent way, as it is at present constituted and maintained. »

Mr. Lancrenon *(French Nord Railway)* emphasised the good results obtained on the Nord Railway with cylindrical tyres of special steel.

Mr. Van Schouwenburg asked what the quality of the steel was.

Mr. Dumas said that it was a special steel called « MOC » with a tensile strength of 100 kgr./mm^2 (57.1 Engl. tons per sq. in.).

Mr. Stroebe indicated that the Reichsbahn had obtained good results with 80-92 kgr./mm^2 (50.8 to 58.4 Engl. tons per sq. in.) steel but could not yet say what results would be obtained with high-speed (160 km. = 100 miles an hour) railcars.

Summary 4 was then adopted with th addition proposed by Mr. Dumas.

Mr. Dumas then read Summary 5 :

5. Block brakes are most general employed at present; they are electr cally controlled in certain countrie (U.S.A., Czechoslovakia) and improve by the use of *Decelakrons* or self-regu ators in proportion to the running spee Amongst new brakes, the disk brake, th eddy-current brake and the N.R. bra with double shoes should be mentione

The *Special Reporter* noted the d crease in the number of drum brake now being fitted.

Mr. Renevey was of the opinion th the expression « in proportion to t running speed » was too strict.

Mr. Dumas modified the text accordin ly, by substituting, for the terms « proportion to the running speed », t wording « giving pressure on the block increasing with the speed ».

Mr. Stroebe then gave details concer ing the use of drum brakes on t *Reichsbahn* : trials are at present in ha with disk brakes, by means of which t heat dissipation is facilitated.

Summary 5 was then adopted aft being altered as stated above.

Prof Dr. Ing. Wechmann then gave the Chair in favour of Mr. Pella *(President of the 3rd Section)*.

Mr. Dumas read Summary 6 :

6. Sound-proofing and air-conditio ing are particularly resorted to at p sent in order to increase comfort.

Steel-tyred vehicles — although th cannot claim the same comfort as pn natic-tyred vehicles — can be improved y means of double partitions with air ushion; all openings should be careully stopped up, and plates be lined vith pulverised felting in order to avoid ibrations.

Air conditioning, and air cooling in ummer (by means of ice or freon), are articularly appreciated in vehicles with ixed window lights.

The *Special Reporter* also stated that ome Administrations have thought it advisable to fit fixed windows, not to improve the streamlining, but to increase he comfort.

Mr. Lévy thought that it would be interesting to know what other countries had done towards lightening the construction in a general way.

The President pointed out that it was necessary to limit any remarks to the ightening of railcars only.

Mr. Baticle *(Ministry of Public Works, France)* asked if the public had been conulted on the subject of fixed windows.

Mr. Dumas thought that if the problem f air-conditioning were solved the public ould be completely satisfied.

Mr. Poncet considered that lightening hould be achieved without increasing he expenditure on maintenance or reucing comfort.

Mr. Stroebe gave information about e practice of the *Reichsbahn* relating ventilation, heating, and reduction of oise.

— Prof. Dr. Ing. Wechmann *took the hair again.*

Mr. Nicolet gave information about ainless steels used for bodywork.

Mr. Ogurek *(Polish State Railways)* asked what effect the position of the engine had on noise.

Mr. Dumas replied that the use of rubber blocks gave good results, whatever the position of the engine.

Mr. Van Schouwenburg asked for information on air-conditioning in tropical countries.

Mr. Sakr indicated that a refrigeration system of American design, by means of freon, had given unsatisfactory results in Egypt, on account of the resulting feeling of humidity.

Mr. Dumas replied that nevertheless this system was in favour in the United States.

The President gave some of his personal experiences in the United States.

Mr. Nicolet concluded that the opinions about air-conditioning depended on national habits and customs.

Mr. Bloch *(Paris-Orleans Railways)* considered that, for short journeys, air, cooled by ice and circulated by means of a 1/4 h.p. fan, was adequate.

Mr. Dumas read the new text proposed for Summary 6, which, after an exchange of views between Messrs. Renevey, Dumas, Van Schouwenburg and Stroebe, was adopted, as worded hereafter.

Mr. Dumas then read Summary 7 :

7. Maintenance costs and amortization charges are the biggest items in the cost price.

The first cost of American railcars is high, but their maintenance costs are reduced to a minimum; in Europe, the desire for lightness has generally led to cheaper construction, which entails higher maintenance costs.

It would be desirable that the Railways agree to calculate in a uniform way the coefficient of use of their railcars, and their cost price.

Mr. PONCET suggested certain modifications to this Conclusion.

Mr. SAKR asked for a more precise definition of the expression « coefficient of use » and drew attention to comparative trials of steam- an diesel-engined railcars, carried out in Egypt, which were favourable to the steam cars for suburban services.

Mr. DUMAS mentioned results obtained in Belgium, which did not shew any financial advantage for one system or the other.

Mr. LÉVY stressed the difficulty there is to make such comparisons.

Mr. DUGAS, on the subject of the second paragraph of the summary, wondered if the term « American railcars » was adequate.

Mr. MUNCK spoke of the use, in Denmark, of short twin engines with the object of increasing the space available for passengers.

Mr. DUMAS read the new summary modified to cover the remarks made. This summary was adopted as worded hereafter.

Mr. DUMAS passed on to Summary 8 :

8. Most Administrations tend to increase the capacity of their railcars, so as to be able to substitute them for steam trains on an increasing scale. The question is to remain very much below th cost per mile of a train.

As regards general design, various s lutions are being resorted to : observ tion railcars, twin railcars or single ra cars coupled together, railcars haulin trailers, multiple-units of 3 to 17 v hicles.

Mr. BARATA on the subject of cost pri wished to see the question of coefficie of use brought in.

Mr. LEGRAND *(Office Central d'Etud du Matériel, France)* supported this su gestion.

Mr. JOURDAIN *(Chemins de fer seco daires du Nord-Est, France)* support Mr. DUMAS' text.

Mr. CARDON *(Paris-Orléans Railwa* thought it was necessary to consider t final balance sheet.

Mr. GOURSAT *(French Nord Railw* proposed a modification to the text the second paragraph.

An exchange of views between Mess CARDON, STROEBE, DUMAS and MATTER t place on the subject of this wording. DUMAS finally proposed the text wh follows in the Chapter « Summaries and this was adopted.

Mr. DUMAS read Summary 9.

9. It would be desirable for the R way Administrations to adopt a comn test method for ascertaining the cha teristic constants of their railcars.

On the other hand, the nominal po of engines should be given the same finition in all countries.

After an intervention by Mr. NIC who desired to see mentioned in the clusions questions of maintenance specialized staff, the summary was adopted, with a slight alteration.

The PRESIDENT stated that the summaries were adopted, and he closed the Meeting at 1.0 p.m.

These summaries were ratified by the Plenary Meeting held on June 7th, the 2nd sentence of the 2nd paragraph of Summary 1 being altered as follows : « This future also depends on future improvements of the track (curves, superelevation, elimination of rail joints or reduction of their number), and especially on the mutual adaptation of the rail motor car, operating methods, and traffic requirements. »

The final summaries are the following :

Summaries.

« 1. Satisfactory technical solutions « have been found in the course of the « last two or three years to the speed, « acceleration, braking and safety pro« blems.

« The future of the railcar now de« pends on the solutions that will be « adopted as regards comfort, economi« cal maintenance and capacity. This fu« ture also depends on future improve« ments of the track (curves, superele« vation, elimination of rail joints or « reduction of their number), and espe« cially on the mutual adaptation of « the rail motor car, operating methods, « and traffic requirements.

« 2. Railcar diesel engines can be di« vided into three classes :

« *(a)* 600-H.P., and over, engines, rela« tively heavy, but very economical as « regards working and maintenance ; « such engines are used extensively in « the United States of America;

« *(b)* 300 to 600-H.P. engines weighing « about 5 kgr. (11 lb.) per H.P., as adopt« ed by most European Railways;

« *(c)* Up to 300-H.P. engines, amongst « which the Czechoslovak, German and « French horizontal engines deserve spe« cial mention.

« By the use of supercharging, which « tends to extend, the weight/power ra« tio of engines can be reduced; improv« ed behaviour of the motion and better « dissipation of the lost heat units are « also obtained.

« 3. Mechanical transmissions are « quite satisfactory, as regards weight, « cost and efficiency, up to 300-H.P., and « allow the coupling up of two or three « vehicles. Mechanical transmissions for « 450 and 500-H.P. are being tested in « Italy and in France.

« Electrical transmissions are now « fully perfected for all powers, giving « full satisfaction for services on moun« tain lines and for multiple-unit work« ing.

« Hydraulic transmissions have made « definite progress in the course of the « last two years, in respect of all powers « and engine speeds, in Austria and Ger« many; they also allow of multiple-unit « operation, even when coupled up to « electrical-transmission units.

« 4. All Administrations are adapting « the suspension of their railcars to the « permanent way, as it is at present « constituted and maintained.

« In order to reduce to a minimum « the vertical movement of bogies, and « to improve comfort, Railways are now « using wheel tyres coned 1/40, cylin« drical tyres, multiple suspension gear

« and rubber shock absorbers. Such de-
« vices have not given rise to any diffi-
« culty, and their use can be recom-
« mended.

« Some Administrations also use de-
« vices to damp out hunting movements
« and vertical vibrations, bogies (arti-
« culated or not) with six or eight
« wheels, loose wheels revolving on fixed
« axles, axleboxes without axleguards,
« etc. All these solutions have given
« them satisfaction.

« 5. Block brakes are most generally
« employed at present; they are electri-
« cally controlled in certains countries
« (U. S. A., Czechoslovakia) and improv-
« ed, in the case of high-speed working,
« by the use of Decelakrons or regulators
« giving pressure on the blocks, increa-
« sing with the speed.

« Amongst new brakes, the disk brake,
« the eddy-current brake and the N. R.
« brake with double shoes, should be
« mentioned.

« 6. Sound-proofing and air-condi-
« tioning are particularly resorted to at
« present in order to increase comfort.

« Steel-tyred vehicles — although they
« cannot claim the same comfort as
« pneumatic-tyred vehicles can be im-
« proved from the point of view of noise,
« particularly by the use of double par-
« titions with air cushion, pulverised
« felting, rubber, and the careful stop-
« ping up of all openings.

« Air conditioning, and air cooling in
« summer (by means of ice or freon),
« are particularly appreciated in vehicles
« with fixed window lights.

« 7. Maintenance costs and amortiza-
« tion charges are the biggest items in
« the cost price of diesel-engined cars.

« Several Administrations are seeking
« above all a reduction of maintenan
« costs by using preferably relative
« slow motors of heavy construction.

« Other Administrations desire ma
« mum lightness in order to increase t
« possibilities of the railcar and to r
« duce the running cost; they consid
« that the progress made in the matt
« of lightening will allow them to arri
« at a reasonable maintenance cost.

« The Congress considers it desira
« that the Railways agree to calculate
« a uniform way the coefficient of u
« of their railcars and their cost pri

« 8. Most Administrations, in order
« improve their operating costs, and
« give satisfaction to the public, tend
« replace their train services by railc
« services and, in this connection, to i
« crease more and more the capacity
« the railcars.

« As regards general design, vario
« solutions are being resorted to : ra
« cars with engines placed underne
« the floor, twin-railcars, or single ra
« cars coupled together, railcars hauli
« trailers, and multiple units.

« 9. The Congress considers it desi
« ble for the Railway Administrations
« adopt a common test method for asc
« taining the characteristic constants
« their railcars.

« On the other hand, the nominal
« wer of internal combustion engi
« should also be given the same defi
« tion in all countries. »

QUESTION V.

Recent improvements in steam locomoti of the usual type and tests of new desi (high-pressure reciprocating locomoti and turbine locomotives) as regards c struction, quality of materials used, e

ciency, working conditions, maintenance and financial results.

esting locomotives at locomotive experimental stations, and in service with dynamometer cars and brake locomotives.

Preliminary documents.

Report (Great Britain, Dominions and olonies, America, China and Japan), by ir H. Nigel Gresley. (See *Bulletin*, De-ember 1936, p. 1291, or special issue o. 9.)

Report (Germany, Austria, Belgium and olony, Denmark, Finland, France and olonies, Hungary, Luxemburg, Norway, etherlands and Colonies, Poland, Swe-en and Switzerland), by Messrs. Par-antier and Dugas. (See *Bulletin*, April 37, p. 895, or special issue No. 27.)

Report (Italy, Spain, Portugal and Co-nies, Czechoslovakia, Jugoslavia, Bul-ria, Rumania, Greece, Turkey and ypt), by Signor Mascini. (See *Bulletin*, oril 1937, p. 1041, or special issue . 28.)

Special Reporter : Sir H. Nigel Gresley. ee *Bulletin*, June 1937, p. 1521, or spe-al issue.)

Report of Section II.

(See *Daily Journal of the Session*, . 4, pp. 1 to 3, and No. 5, p. 1.)

Meeting held on June 4th, 1937.

The President declared the Meeting en at 9.30 a. m.

Before commencing the discussion of estion V, he stated that he felt sure was voicing the feelings of the whole eting in regretting that the absence Sir Henry Fowler (*Chairman of Committee, Ministry of Transport, Great Britain*), owing to ill health, deprived them of his great knowledge and long experience.

The President then called upon Sir Nigel Gresley, *Special Reporter*.

Sir Nigel Gresley briefly summarised his special report, and read Summary 1 :

1. There has not been any marked increase in boiler pressures since 1930. A pressure of about 284 lb./sq. inch (20 kgr./cm^2) has been regarded as the limit for boilers of conventional design. A total steam temperature of about 752° F. (400° C.) appears to be the maximum which is desirable owing to difficulties with lubrication, and the effect due to creep of the metals in contact with the steam if this temperature is much exceeded.

Mr. Parmantier (*Reporter*) stated he would have preferred to say that a pressure of 20 kgr./cm^2 (284 lb./sq. inch) is the current pressure for boilers of the usual type, and that for this pressure it would be interesting to have a temperature in excess of 400° C. (752° F.).

Mr. Günther (*Deutsche Reichsbahn*) supported the modification suggested by Mr. Parmantier, and gave information on this subject, regarding new types of locomotives on the *Reichsbahn*.

Mr. Mascini (*Reporter*) called attention to the distinction which should be made between piston-valve and poppet-valve types of distribution.

Mr. Chapelon (*Paris-Orléans Railways*) considered that the word « desirable » was not correct; the desirable temperature would be in excess of 400° C.

Sir Nigel GRESLEY proposed the necessary modifications to take these remarks into account.

Mr. RENEVEY (*Algerian Railways*) suggested the expression « *compatible* with good lubrication ».

Mr. PONCET (*French Est Railways*) supported Mr. RENEVEY's proposition, and pointed out that on the *Est Railway* lubrication difficulties are experienced rather with the cylinders.

Sir Nigel GRESLEY then read out the summary modified in accordance with these opinions, which was adopted.

He then proceeded to Summary 2 :

2. The enlarging of the steam pipes and passages has reduced the pressure drop between the boiler and steam chest, thereby improving the steam circuit.

Sir Nigel GRESLEY suggested that this should be modified as follows :

« The enlarging and improving of the live and exhaust steam pipes and passages has reduced the drop of pressure between the boiler and cylinders and has facilitated the discharge of the exhaust steam, thereby improving the steam circuit. »

Mr. MASCINI proposed the text : « The enlarging of the steam pipes and sections of the passages between the boiler and the exhaust has improved the steam circuit. »

Sir Nigel GRESLEY stated that he thought this wording much too general.

Mr. LANCRENON (*French Nord Railway*) would have liked to see mentioned in the Summaries the improvements made in the exhaust.

Sir Nigel GRESLEY proposed to say, in this connection « the enlarging *and improving* of the steam passages... ».

Mr. RENEVEY asked for a special clause to be included regarding the exhaust.

Sir Nigel GRESLEY and THE PRESIDENT considered it necessary to limit the summaries to the most important points.

Mr. CHAPELON strongly supported th proposition made by Mr. RENEVEY an gave details with regard to improvement in the exhaust system.

— Summary No. 2 was adopted afte being modified.

Sir Nigel GRESLEY read Summary No. 3

3. The scientific streamlining of locomotives appreciably reduces air resista ce at high speeds, and therefore i creases the horse-power available fo traction.

Streamlined locomotives of the rec procating type specially designed fo extra-high-speed working have been i troduced by several Administrations si ce 1930.

Mr. GÜNTHER gave detailed informatio on the results obtained with complete streamlined locomotives on the *Reich bahn*, as compared with high-speed loc motives of the same design, but n streamlined.

— Summary No. 3 was adopted wit out modification.

Sir Nigel GRESLEY read Summary No.

4. The use of non-condensing turbi locomotives is being developed.

Mr. MASCINI considered that this su mary gave the impression of a very a vanced development of the turbine loc notive; he would have preferred to speak f the *trials* of turbine locomotives.

Sir Nigel GRESLEY proposed a text nodified accordingly an this was adopted (see *Summary No.* 5, page 1908).

Mr. RENEVEY again asked before leaving he first part of question 5, that a supplementary clause regarding the exhaust ystem should be inserted. He proposed he following wording :

« Interesting progress has been realised in the design of the exhaust, whereby the counter pressure has been reduced, combustion improved, and the hermic efficiency of the locomotive improved. »

This wording is adopted and becomes Summary No. 3, the former No. 3 becoming No. 4.

Sir Nigel GRESLEY read Summary 5 of is special report :

5. Testing stations are regarded as essential for the scientific study, and the precise and comparative investigation of he design, performance and efficiency f locomotives and their components.

— This Summary is adopted without ny discussion and becomes No. 6 of the ew summaries.

Sir Nigel GRESLEY read Summary 6 of is special report :

6. Trials with dynamometer cars in onjunction with brake locomotives form he best method of determining the aximum drawbar horse-power and uel consumption of locomotives under ervice conditions.

Mr. RENEVEY considered that the tests hould be completed with trials in service with a number of locomotives.

Mr. GÜNTHER supported the motion of Mr. RENEVEY.

Mr. MASCINI pointed out that, in Italy, results under working conditions were always comparable with those of the trials.

Mr. RENEVEY stated he would prefer, added to the summary, that it is essential that trials on plants and with brake locomotives should be confirmed by trials under working conditions.

Mr. BULLEID (*London & North Eastern Railway*) considered the word « essential » too strong, and that « useful » would be better.

Mr. PARMANTIER, asked Mr. RENEVEY what we would expect to achieve by trials under working conditions, seeing that the results depend entirely on the services worked.

Mr. RENEVEY gave information regarding the procedure on the P. L. M. at the time he was an official of that Company.

Sir Nigel GRESLEY thought it superfluous to insist on something which is actually current practice.

— Summary No. 7 (former No. 6) was adopted without alteration.

Sir Nigel GRESLEY read Summary 7 of his special report :

7. It is desirable that all Railways should agree a standard programme for the testing of locomotives, both at a testing station and under service conditions with dynamometer car and brake locomotive, so that accurate comparative results can be obtained.

Mr. DUGAS (*Reporter*) drew attention to the difficulty met with when comparing fuel consumption figures between Administrations (marked influence of the coking power on the test results).

Mr. PONCET supported this view, but stated that anyhow steam consumptions might be added to the comparable factors.

Mr. OGUREK (*Polish State Railways*) stated that in order to obtain comparable results, it is good practice to have the tests on the testing plant followed by tests according to the *Czeczott* method, and he asked that this be mentioned in the summary.

Mr. PARMANTIER stated that this method had been dealt with in his report and THE PRESIDENT pointed out that the summaries can only be of a general nature.

— Summary 8 (former 7) was adopted.

THE PRESIDENT thanked the Special Reporter and the Reporters for the remarkable reports they had furnished and stated that the summaries had consequently been adopted as worded hereafter.

Summaries.

« 1. There has not been any marked « increase in boiler pressure since 1930. « A pressure of about 284 lb./sq. inch « (20 kgr./cm^2) can be regarded as the « generally observed limit for boilers of « conventional design.

« A total steam temperature of about « 752° F. (400° C.) appears to be the ma« ximum compatible with good lubrica« tion, and the creep effect of the metals « in contact with the steam.

« 2. The enlarging and improving of « the live and exhaust steam pipes and « passages has reduced the drop of pres« sure between the boiler and cylinders « and has facilitated the discharge of the « exhaust steam, thereby improving the « steam circuit.

« 3. Interesting progress has been rea« lised in the design of the exhaust, « whereby the counter-pressure has been « reduced, combustion improved, and the « thermic efficiency of the locomotive « improved.

« 4. The scientific streamlining of lo« comotives appreciably reduces air « resistance at high speeds, and there« fore increases the horse-power availa« ble for traction.

« Streamlined locomotives of the reci« procating type, specially designed for « extra high speed working, have been « introduced by several Administrations « since 1930.

« 5. Tests are being carried out with « turbine locomotives, with a tendency « to abandon condensation.

« 6. Testing stations are regarded as « essential for the scientific study and « the precise and comparative investiga« tion of the design, performance and « efficiency of locomotives and their « components.

« 7. Trials with dynamometer cars in « conjunction with brake locomotive « form the best method of determining « the maximum drawbar horse-powe « and fuel consumption of locomotive « under service conditions.

« 8. It is desirable that all Railway « should agree a standard programm « for the testing of locomotives, both at « testing station and under service co « ditions with dynamometer car an « brake locomotive, so that accurate com « parative results can be obtained. »

— These summaries were ratified b the Plenary Meeting held on June 7th

QUESTION VI.

Iethods and devices used, in connection with electric traction, to save current between the supply side of the power station and the driving wheels (feeders, substations, tractors), and in particular the use of mercury rectifiers.

Preliminary documents.

Report (Great Britain, Dominions and 'olonies, India, North and South Ame-ica, China, Japan), by C. E. Fairburn. See *Bulletin*, January 1937, p. 73, or pecial issue No. 14.)

Report (Switzerland, France and Colo-ies, Spain, Portugal and Colonies, Italy, elgium and Colony, Luxemburg, Nether-nds and Colonies, Egypt), by Messrs. gcenberger and Eckert. (See *Bulletin*, arch 1937, p. 641, or special issue o. 21.)

Report (Austria, Germany, Denmark, orway, Sweden, Finland, Poland, Hun-ry, Czechoslovakia, Jugoslavia, Bulga-a, Rumania, Greece, Turkey), by E. R. aan. (See *Bulletin*, March 1937, p. 705, special issue No. 22.)

Special Reporter : C. E. Fairburn. (See *lletin*, June 1937, p. 1528.)

Report of Section II.

(See *Daily Journal of the Session*, . 6, pp. 2 to 5; No. 7, pp. 2 to 4; No. 9, 1.)

Meeting held on June 8th, 1937.

— The Meeting was opened at 9.30, der the presidency of Prof. Dr.-Ing. chmann.

The President called on Mr. Fairburn *pecial Reporter*).

Mr. Fairburn, after a few introductory remarks, read Summaries 1 and 2 of his special report.

1. Proposals for saving current cannot be considered on purely technical grounds, but must be related to the total cost to the railway, of the service performed.

2. In addition to savings due to improvements in the equipment, which cannot be expected to make a great difference in the total energy consumption, direct savings in the energy required and in the recovery of energy by regenerative braking demand serious consideration.

— These summaries were adopted without comments.

The President then asked Mr. Fairburn to read his summaries regarding the important question of mercury-vapour converters.

Mr. Fairburn read Summaries Nos. 3 and 4.

3. The most important contribution of recent years to the improvement of electric traction equipment, particularly as regards saving energy, is the mercury-vapour converter. In its full development it will tend to displace all types of rotating converters now in use.

4. For the conversion of alternating to direct current, the rectifier can already be regarded as the standard unit in new installations.

The President gave information concerning the use on the *Reichsbahn* of mercury-vapour converters. He considered that the development of such apparatus is far from complete and that when fully developed, it will replace the rotary converter in the same way that the mercury-arc rectifier already replaces the rotary converter.

At the request of Mr. PARODI (*Honorary Electrification Manager, Paris-Orléans Railways*), concerning a literal translation of the German term « Starrer Unformer », the PRESIDENT pointed out that it was used in connection with transformers giving a fixed frequency ratio.

Mr. EGGENBERGER (*Reporter*) considered that the question under discussion should be treated as part of Summary 6, rather than under Summaries 3 and 4.

Mr. CARDON (*Paris-Orléans Railways*) considered it would be premature as might be supposed from the present wording of the summary, to condemn the rotary converter, the more so that there still existed certain difficulties with regard to rectifiers.

The PRESIDENT proposed to make a single summary with clauses 3 and 4, taking into account the remarks made, and Mr. FAIRBURN signified his agreement to the proposed wording.

— The new wording of Summary 3 was then adopted.

Mr. FAIRBURN read Summary 5 of his special report :

5. The mercury-vapour inverter has proved satisfactory for reconverting direct to alternating current in the substations of direct-current lines employing regenerative braking.

Mr. NICOLET (*French State Railways*) asked if any Administrations had any experience with the inverter in the case of regenerative braking.

Mr. FAIRBURN gave information on the South-African Railways' installations and pointed out that, after carrying out trials this Administration had placed order for a further series of such apparatus.

Mr. PARODI pointed out that this wa an isolated case.

Mr. FAIRBURN considered that the pla cing of a large order implied satisfactio with the results obtained.

The PRESIDENT proposed, under thes conditions, to mention that the good re sults obtained by one Administratio would induce other Administrations t seek further progress in the same dire tion.

At the request of Mr. PARODI, Mr. FAI BURN stated that the South-African insta lations are of the two-tank type.

— Summary 5, as modified, was ado ted as No. 4.

Mr. FAIRBURN read Summary 6 of h special report :

6. Theoretical problems raised by use of the mercury-vapour converter the conversion of three-phase current either single-phase current or to thr phase current of another frequency ha been solved, but practical difficulties main and present installations must regarded as experimental.

The PRESIDENT would have desi greater precision and asked for a disti tion to be made between fixed-ratio variable-ratio transformers.

Mr. KARLSBAD (*Polish State Railwa* supported by Mr. PARODI, proposed to the word « mutator » in place of « c verter ».

The PRESIDENT proposed a new d for Summary 6, which was adopted No. 5.

Mr. Fairburn read Summary 7 of his special report :

7. Grid control equipment is an inherent part of the mercury-vapour converter for all uses except as a rectifier. In addition to its main function the equipment can be adopted to control the output voltage and to interrupt the main arc for protective purposes; in some cases it may be worth while adding it to a rectifier to give these features.

An exchange of views took place between the President and Messrs. Fairburn and Parodi on the wording of this summary and its German translation. Finally it was agreed to delete the last sentence (in some cases...) of the summary, which was then adopted.

The President, however, wished to draw attention to the description of the Höllentalbahn mutator locomotives, which had appeared in *Elektrische Bahnen* of March 1937.

Mr. Fairburn read Summary No. 8 :

8. In cases where ripples in the output f a rectifier cause interference in communication or signal circuits, the provision of resonant shunt filters provides a satisfactory solution.

The President wished to state that, instead of « rectifier », the term « mutaor » should be employed, in the more general sense.

Mr. Cardon asked whether, in the case f compound rectifiers, resonant filters gave satisfaction. The summary appeaed too formal.

Mr. Karlsbad was of the same opinion and pointed out that the Polish Railways had not satisfactory solved the question of interference with telegraph and track circuits.

The President pointed out that, in all cases, it had been possible satisfactorily to solve the question, but long search had been entailed. He asked Mr. Karlsbad how long these difficulties had existed on his System.

Mr. Karlsbad replied that the electrification was quite recent.

Mr. Fairburn stated that he had conducted a special investigation into this subject in the United States of America. A good solution had been found in all cases met with, with the exception of wireless communication.

After an exchange of views between Messrs. Cardon, Fairburn and Parodi, the summary was adopted as the new No. 7.

Mr. Fairburn read Summary 9 :

9. The water-cooled steel tank type unit is most widely used but the glass bulb type and also the newly developed low-capacity air-cooled type form useful alternatives for some applications.

— Adopted without alteration, as No. 8.

Mr. Fairburn read Summary 10, dealing with *transmission lines* :

10. A separate transmission system purely for railway use is best when the generating plant is used wholly for railway purposes.

Mr. Parodi proposed the deletion of Summaries 10 to 13, which contained, in his opinion, no information which would be of guidance to any Administration, with regard to operating or development.

Summaries 11 to 13 were worded as follows :

11. A combined railway and industrial transmission system can be adopted with advantage when the railway network is widespread and covers territory having a large industrial load.

12. High-tension direct-current transmission, although offering possible transmission savings, is not yet commercially practicable.

13. Leakage and corona losses on high-tension transmission lines can be overcome by established methods such as the use of guard rings and hollow cables.

An exchange of views on Mr. Parodi's proposal took place between the President and Messrs. Fairburn and Parodi, and resulted in the *deletion of these four summaries.*

Mr. Fairburn read Summary No. 14 of his special report, dealing with *substations :*

14. The substations must be arranged to feed the contact system at a sufficient number of points to give a low contact system loss without unduly heavy construction.

— At the request of the Pesident and Mr. Nicolet, Mr. Fairburn indicated the exact meaning of this summary. After an intervention by Messrs. Parodi and Eggenberger, it was decided to present a new draft to the Meeting on June 9th.

Mr. Fairburn read Summary 15 of his special report :

15. On A.C. lines this can be effected by intermediate feed points between main substations in which simple, preferably outdoor, equipment is used and controlled either from the nearest railway station or by a remote contro system.

Mr. Eggenberger gave information o the installations with intermediate trans formers between substations in service o the Swiss Federal Railways. After slight modification, the text of Sum mary 15 was adopted, as the new No. 1

Summary 16 :

16. On D.C. lines the same result ca be obtained by the use of remote-co trolled single unit rectifier substation

— Adopted without alteration a No. 11.

Summary 17 :

17. The additional cost of remote-co trol as compared with automatic contr is normally justified by the increase flexibility given to the system.

— Adopted, with the addition of th word « completely » (completely aut matic control).

Summary 18 of the special report :

18. The mobile substation can som times be used with advantage to me seasonal traffic fluctuations.

After an intervention by Messrs. C don and Parodi, this summary was m dified by substituting « to meet temp rary operating needs » for « to me seasonal traffic fluctuations » (No. of the revised summaries).

Summaries 19 and 20 :

19. No appreciable improvement transformer efficiency can be secur except at excessive cost.

20. The efficiency of rotating conve ing plant is inherently low; an impro

nent can be secured by the substitution of mercury-vapour converters.

The President and Mr. Parodi consilered that these clauses contained no new lefinite findings, and it was decided to *lelete* them.

— *Summary 21* of the special report, lealing with contact systems was also leleted :

21. In reducing contact system losses, ttention must be given to both the rail eturn circuit and to the contact line or onductor rail.

Mr. Fairburn read *Summary 22* :

22. On alternating-current lines, oper-ting at high voltage, the contact system sses are readily reduced to a reason-ble value and any special steps are sually needed to prevent communica-on circuit interference rather than to ve current.

— This was adopted without alteration, the new No. 14.

Summary 23 of the special report :

23. On D.C. systems the losses are hi-er, and special consideration must be ven to the question of securing a reduc-n. Apart from increasing the contact e section or rail section, these include proved bonding by welding, and the ss bonding of tracks and contacts cir-its.

— This summary was adopted with a ght alteration suggested by Mr. Parodi.

Mr. Fairburn read *Summary 24* regar-ng *rolling stock* :

24. The weight of alternating-current omotives is now comparable with that direct-current locomotives for similar ties, and in both cases questions of adhesion prevent any large reduction in weight. Some reduction can be anticipated from fitting « fine » regulators and devices which transfer weight from carrying to driving wheels during starting.

The President considered that it was necessary to state above all that the weight of the electric locomotive has been considerably reduced during the last few years, without any distinction being made as regards the nature of the current, or the voltage.

Mr. Parodi asked for it to be mentioned that the total weight of electric locomotives has been considerably reduced, for equal horse-power and tractive effort.

— The summary was adopted after being amended in this sense, and became *No. 16.*

Summaries 25, 26 and 27 :

25. Streamlining of locomotives, as a means of saving energy, is of relatively small value unless the whole train is similarly treated.

26. Weight reduction is the most important means of saving energy on motor coach stock. This may be attained by changes in construction and by the use of special materials. Changes in construction include the combination of the body with the underframe and the use of welding, while special materials may be divided into light alloys and high-tensile steels.

27. Streamlining is of value on high-speed trains, but questions of interchangeability and variable train make-up tend to restrict it to set trains and single-unit coaches.

Mr. Koller *(Vice-President)* remarked that Summary No. 26 referred also to the weight of the rolling stock. He proposed, under these circumstances, that Summary 26 should be dealt with first, and that Summaries 25 and 27, dealing with streamlining should be combined.

Mr. GÜNTHER *(Deutsche Reichsbahn)* thought that the summary understated the importance of streamlining; he gave results of trials made on the *Reichsbahn* with completely streamlined steam locomotives. He thought that similarly streamlined electric locomotives would give better results.

Mr. PARODI considered that the figures for the economies were so high that there must be some misunderstanding as regards the basis of calculation.

Mr. GÜNTHER expressed the opinion that a streamlined form in the full sense of the word should be given.

Mr. KOLLER proposed a new wording for Summaries 25 and 26, which was adopted as No. 18, reproduced hereafter.

— The Meeting ended at 1.0 p. m.

Meeting held on June 9th, 1937.

— The Meeting opened at 9.30 a. m., Prof. Dr.-Ing. WECHMANN being in the chair.

The PRESIDENT recalled that a new draft had to be proposed for Summary 14 of the special report, with regard to the location of substations. This new draft was published as No. 9 at the same time as the summaries which had already been adopted by the Section. It was worded as follows :

« 9. The substations should be situated at sufficiently short intervals to ensure a low voltage drop in the contact
system although only the minimum c
copper and other materials is used i
the construction of the contact syste
itself and in the substations. »

The PRESIDENT asked if any one wou
like to speak about this new draft.

Mr. EGGENBERGER proposed that, in t
German text, the word « gegenseitig
should be deleted, as it did not appe
in either the French or English texts.

— Summary 9 was adopted witho
any further remarks.

Mr. FAIRBURN read Summary 28 of
special report, with regard to rol
bearings :

28. Roller bearings are used as mu
to reduce lubrication and maintena
costs as to save energy; in conseque
they are found more widely on mo
coaches than on locomotives, and h
been applied to motor armatures m
frequently than to the locomotive
train axle journals.

— This summary was adopted with
any modification, and became No. 1

Mr. FAIRBURN read Summary 29 of
special report.

29. The operating advantages of
tric coach heating over fuel-fired bo
are such that boilers are normally ad
ed only in cases where the stoc
hauled by both steam and electric l
motives, and they cannot be regarde
a means of saving energy.

Mr. CARDON proposed to say « possi
in place of « normally ».

Mr. PARODI insisted that it shoul
stated that electric heating is the me
normally employed.

Mr. Hayashi (*Japanese Government ailways*) proposed the deletion of the lause which concerned only the choice f a heating system.

The President and Mr. Cardon sup-orted Mr. Parodi, who proposed a new ording for the summary.

Mr. Nicolet stated that there are ve-icles, which are heated by both an lectrical system and from the locomotive oiler.

Mr. Ribitch (*Jugoslav State Railways*) ipported Mr. Hayashi's proposal.

Mr. Parodi insisted on the summary eing retained, seeing that opponents of ectrification have always pointed out ie difficulties regarding the question f heating. It must be stated that elec-ic heating is the most economical.

The President, Messrs. Fairburn and arlsbad were of the same opinion.

Mr. Karlsbad stated how the heating roblem arose in Poland, the vehicles orking partly on electrified lines and rtly on steam-operated lines.

He asked if other Administrations had perience with electrically-heated boi-rs. His system was operated at 3 000 lts.

The President gave particulars of the perience of the *Reichsbahn* on this bject. Electric heating of the boiler is mplicated and uneconomical. Tests are ing carried out for heating in the case 1 500 and 3 000-volt systems, and with 000-volt single-phase current in the ntact system.

Mr. Parodi proposed the definite text the summary; this was adopted and given *under No. 20 hereafter.*

Mr. Fairburn read *Summary 30* of his special report :

> 30. The fitting of thermostats on electric heating systems, by assisting the train staff in controlling the coach temperature, often leads to considerable energy saving.

Mr. Cardon proposed to delete « by assisting the train staff in controlling the coach temperature », as the precise object of thermostats is to regulate the temperature without intervention of the staff, and with a greater economy of current.

The summary was adopted with this modification, and became No. 21.

Mr. Fairburn read Summary 31 of his special report :

> 31. The use of a single electric heater in conjunction with a system of hot air ducts in each coach may be more economical than the fitting of a number of electric radiators, as the preheating time can be reduced.

Mr. Parodi agreed in the main, but proposed to state that the use of heating by means of pulsated or conditioned air could be more economical than heating by a number of electric radiators.

The President gave results of experiments on the *Reichsbahn*.

Mr. Nicolet pointed out that the new suburban stock of the *French State* is equipped with a pulsated-air system.

After an exchange of views between the President, and Messrs. Parodi and Fairburn, it was decided to complete Summary 31 as follows : « taking into account the time required for preheating, the ventilation realised, and the lightening of the vehicles ».

Mr. FAIRBURN read Summary 32 of his special report :

32. In Winter, the maximum energy demand of a train can be reduced by cutting out the heating system when accelerating or ascending heavy gradients.

The PRESIDENT gave information on the practice followed on the Hamburg suburban railways, and pointed out the distinction which must be made between the consumption of energy and the expenses relative thereto, according to whether the rate of payment was for maximum consumption or not.

Mr. KAAN insisted on the conclusion being retained, as it dealt with a general practice.

Mr. VILLENEUVE (*French Midi Railways*) remarked that there is no real saving of energy, as it is necessary to compensate the cutting off of heating at other times.

Mr. KAAN (*Reporter*) stated that this is quite true theoretically, but in practice, preheating at stations is so strong that there is on the whole, rather an excess of heat, and that there is consequently no inconvenience in cutting off the heating whilst accelerating.

Mr. KARLSBAD also pointed out that with certain types of contracts, it would be desirable to reduce the peak consumption in order to reduce the expenses.

Mr. NICOLET pointed out that considerable savings had been realised by the French State Railways under similar conditions.

Mr. VILLENEUVE thought that this was consequently a question of savings on tariff charges.

Mr. KARLSBAD would have liked a cor clusion added, recommending the installa tion of combined types of heating appa ratus in international coaches.

Mr. KAAN, whose Administration ha had, for the last 12 years, coaches pro vided with a combined system of heatin thought that this question was rath one for the International Railway Unio

Mr. FAIRBURN then pointed out th question VI solely dealt with savings current.

Mr. KARLSBAD supported these remark

The PRESIDENT then proposed to add the text of Conclusion 32 in the for suggested by Mr. NICOLET, and this reproduced as *No. 23* herunder.

Mr. FAIRBURN read Conclusion 33 his special report, dealing with *rege rative braking* :

33. Present systems of regenerat braking which operate only above relatively high speed, are of value o on lines having long heavy gradients

Mr. CARDON pointed out that the pression « relatively high speed » not definite enough in meaning.

Mr. FAIRBURN proposed to replace wording by « certain speeds ».

A discussion took place between Mes PARODI, the PRESIDENT, FAIRBURN GRAFF-BAKER (*London Passenger Tra port Board*), on the two types of bra in question.

Mr. BACQUEYRISSE (*French Local O nizing Commission)* gave detailed pa culars of the results obtained by the of compound motors on the tram iotor coaches of the « Société de Transorts en Commun de la Région Pariienne » and proposed a text of the conlusion, taking these results into consieration.

Mr. Fairburn would be disposed to upport the wording suggested for Sumary 33 by Mr. Graff-Baker.

Mr. Parodi pointed out that this was nly a matter of form, and Summary 33 *new No. 24*) was adopted, including the xpression « above certain speeds ».

Mr. Fairburn read Summary No. 34 of is special report :

34. Systems on trial on direct-current nes which operate down to low speeds nd can be used in normal train stops ay prove of considerable value in subrban service.

Mr. Parodi, in connection with a modiication proposed by Mr. Bacqueyrisse, tated that one could not limit the alluion to one type of motor, since a numer of systems give the same results.

The President supported these remarks nd the conclusion was adopted, with a odification taking into account the serices effected.

Mr. Fairburn read Summary 35 of his pecial report :

35. In suitable cases, the question of warding bonuses to train drivers on the sis of energy used might be investiged.

Mr. Cardon wished the Summary might supplemented. The P. O. Railway troduced several years ago a system bonuses for economy in energy consumption. He proposed a new draft for this conclusion.

Mr. Parodi stated that meters had been installed on P. O. stock for the consumption of energy by the traction motors only.

The President considered that if the bonus was awarded for economy on consumption only, the punctuality would suffer. The summary should specify the necessity of having at the same time an award for punctuality.

Mr. Bacqueyrisse agreed on this subject, but considered that for compound motors, economy bonuses are no longer justified, and that his Administration had removed the meters on these motors.

Mr. Parodi was in agreement on the advantages of compound motors, but confirmed that there were other means of arriving at identical results.

The President considered that the details of the systems in question could not be entered into, and proposed a modified text, which is reproduced hereafter as No. 26.

The President pointed out that the agenda for the day was completed. He thanked the Reporters and particularly the Special Reporter for their valuable contributions to the work of the Congress.

Mr. Fairburn thanked the President, on behalf of the Reporters for his efficient conduct of the discussions, also Mr. Velleman, for interpreting, in such a very satisfactory manner, a very difficult subject.

— The Meeting concluded at 12.30 p.m.

The summaries adopted are worded as hereafter :

Summaries.

« 1. Proposals for saving current cannot be considered on purely technical grounds, but must be related to the total cost to the railway, of the service performed.

« 2. In addition to the savings due to improvements in the equipment, which cannot be expected to make a great difference in the total energy consumption, direct savings in the energy required and in the recovery of energy by regenerative braking demand serious consideration.

« 3. The most important contribution of recent years to the improvement of electric traction equipment is the mercury vapour converter.

« This type of equipment has not yet reached its full development; it is however possible to predict that, in the near future, this development will reach a point where the mutator will replace the rotary converter in the same measure as the rectifier at present replaces the rotary converter for the conversion of alternating current to direct current.

« 4. The mercury vapour inverter has proved satisfactory on one Administration for reconverting direct to alternating current in the substations of direct-current lines employing regenerative braking. This will no doubt induce other Administrations with direct-current systems to seek further improvements in the same direction.

« 5. The fixed frequency ratio mutator has given satisfaction for the conversion of three-phase current to single-phase current of low frequency (Reichsbahn).

« Several types of mutators of variable frequency ratio have been tried. It cannot, however, be predicted yet, which of these systems will eventually give satisfaction.

« 6. Grid control equipment is an inherent part of the mercury vapour converter for all uses except as a rectifier In addition to its main function th equipment can also be adopted for al types of mutators to control the output voltage and to interrupt the mai arc.

« 7. In cases where ripples in the output of a mutator cause interference i communication or signal circuits, th provision of resonant shunt filter provides a satisfactory solution.

« 8. The water-cooled steel tank typ unit is the most widely used, but th glass bulb type, and also the newl developed low-capacity air-cooled typ form useful alternatives for some ap plications.

« 9. The substations should be situate at sufficiently short intervals to ensur a low voltage drop in the conta system, although only the minimum copper and other materials is used the construction of the contact syste itself and in the substations.

« 10. On alternating-current lines th can be effected by the introducti between substations of intermedia feed points provided with a simp transformer controlled either from t nearest railway station or by a remo control system.

« 11. On direct-current lines the sa results can be obtained by the use remote-controlled single-unit rectifi substations.

« 12. The additional cost of rem control as compared with complet automatic control is normally justifi by the increased flexibility given the system.

« 13. The mobile substation can sometimes be used with advantage to meet temporary operating needs.

« 14. On alternating-current lines operating at high voltage the contact system losses are readily reduced to a reasonable value and any special steps are usually needed to prevent communication circuit interference rather than to save current.

« 15. On direct-current systems the losses are higher, and special consideration must be given to the question of securing a reduction. Apart from increasing the conductor rail section, these include improved bonding of tracks and contact circuits.

« 16. The weight of electric locomotives for equal horse-power and tractive effort has been considerably reduced during the last few years.

« 17. Weight reduction, particularly on motor coach stock, is the most important means of saving energy. This may be attained by changes in construction and by the use of special materials. Changes in construction include the combination of the body with the underframe and the use of welding, while special materials may be divided into light alloys and high-tensile steels.

« 18. For high-speed trains the streamlined form has a large influence on the consumption of energy.

« The maximum result will be obtained from the complete streamlining of the whole train set.

« 19. Roller bearings are used as much to reduce lubrication and maintenance costs as to save energy; in consequence they are found more widely on motor coaches than on locomotives, and have been applied to motor armatures more « frequently than to the locomotive or « train axle journals.

« 20. Electric heating of vehicles is « normally adopted on most electrified « systems, the steam heating apparatus « being maintained. Fuel-fired boilers « are used only in the case of vehicles « drawn by both steam and electric locomotives, but they cannot be regarded « as a means of saving energy.

« 21. The fitting of thermostats on « electric heating systems often leads to « considerable energy savings.

« 22. The use of a single electric heater « in conjunction with a system of hot « air ducts in each coach may be more « economical than the fitting of a number of electric radiators, taking into « account the time required for preheating, the ventilation realised, and « the lightening of the vehicles.

« 23. In winter, the peak load of energy can be reduced by cutting out the « heating system when accelerating or « ascending heavy gradients or during « the periods of heaviest traffic.

« 24. Present systems of regenerative « braking are of value only on lines having long heavy gradients, since they « operate only above certain speeds.

« 25. Systems on trial on direct-current lines which operate down to low « speeds and can be used for normal « train stops may prove of considerable « value because they reduce the consumption of energy in services with « frequent stops.

« 26. In suitable cases, the question « of awarding bonuses to train drivers, « for economical consumption of energy « by the driving motors, might be considered, providing these are combined « with awards for punctuality. »

3rd SECTION. — Working.

President : E. Pellarin.
Vice-Presidents : J. A. Valentin, M. Yoyitch, F. Stockinger and H. Etter.
Principal Secretary : J. Van Ryn.

QUESTION VII.

Economical operation of the main line systems' secondary lines.

Various methods adopted to adjust the operating facilities, safety measures, and station organisation to the volume of traffic.

Preliminary documents.

Report (France and Colonies, Belgium and Colony, Luxemburg, America, China and Japan), by Messrs. Grandjean and Gilmaire. (See *Bulletin*, October 1936, p. 999, or separate issue No. 2.)

Report (Italy, Spain, Portugal and Colonies, Switzerland, Austria, Hungary, Czechoslovakia, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt), by G. C. Palmieri. (See *Bulletin*, November 1936, p. 1129, or separate issue No. 5.)

Report (Germany, Great Britain, Dominions and Colonies, Denmark, Finland, Norway, Netherlands and Colonies, Poland and Sweden), by T. Emers. (See *Bulletin*, November 1936, p. 1183, or separate issue No. 6.)

Special Reporter : G. C. Palmieri. (See *Bulletin*, June 1937, p. 1538.)

Report of Section III.

(See *Daily Journal of the Session*, No. 4, pp. 3 and 4, and No. 5, p. 1.)

Meeting held on June 4th, 1937.

The Meeting was opened at 9.30 a. m. Mr. Pellarin being in the Chair.

The President called upon Mr. Palmieri (*Special Reporter*) who briefl summarized his special report. The section then opened the discussion of th summaries proposed by the Special Reporter.

Summary 1 :

1. The organisation of the differen services on secondary lines should hav as its aim the reduction of operating expenses to a minimum.

The fact should not be overlooke however, that it is essential to improv the service as much as possible in orde to meet the requirements of the publi and recover, at least partly, traffic lo to road competition.

Mr. Barata *(Portuguese Railways Company)* wanted particulars as regards th definition of secondary lines.

Mr. Palmieri replied that he was dea ing, in his report, only with lines c lesser importance which were operate by the main-line Systems. He propose to add a special note on this subject.

Mr. Matter *(Swiss Federal Railways* wanted to have the goods services mentioned and not only the passenger services.

Mr. Palmieri agreed and Summary 1 was consequently slightly amended.

Summary 2 :

2. The possibility of reducing the ex-enses must be sought in the field of echnical installations, in the domain of ie methods of transport and in the doption of simplified operating me-iods.

Mr. Level (*Voies ferrées d'intérêt lo-il, France*) wanted to refer to the trans-r of the operation of certain lines to cal private companies.

Mr. Palmieri pointed out that ques-on VII referred solely to secondary nes worked by main-line Systems. The resident, Messrs. Yoyitch (*Vice-Presi-ent*), and Giovene (*Italian State Rail-ays*) were of the same opinion.

— Summary 2 was adopted.

Summary 3 :

3. Technical installations should be apted to actual traffic requirements d not require any costly upkeep.

Simplification of signalling, and even mination of signals where possible, nplification of the operation of points d other appliances, discontinuation of arding at certain level crossings, are measures frequently adopted, which n be recommended with a view to ecting savings.

After some explanations given to Mr. rata by Mr. Palmieri, the proposed t was adopted.

Summaries 4, 5 and 6 :

4. Substitution of more economical thods of transport for steam trains is e of the essential conditions for reducing expenses. From this standpoint, the use of railcars, when traffic conditions, either passenger or goods, are not against it, gives appreciable advantages.

5. Railcars have undergone a very rapid development which is worthy of being followed up. Owing to their low cost price they have made it possible to considerably increase the commercial speeds, to increase the train frequency and the number of stops, etc., in fact to greatly improve the working on secondary lines.

It is desirable, however, that railcars can be coupled up and run as twins, or be able to haul one or two trailers.

6. Reduction of the train weight is another factor of economy. The use of light and short trains is a step strongly to be recommended. It is also advisable to restrict the number of classes on passenger coaches by abolishing first class and, where possible, also second class.

Careful use of the useful loading capacity of goods wagons is another means of effecting economies.

As Summary 4 was found to be a combination of Summaries 5 and 6, these three summaries were discussed at the same time.

Mr. de Spirlet (*Nord-Belge Lines*) wanted reference made to light steam trains, which had given good results on several Systems.

Messrs. Latrasse (*French Nord Railway*), Giovene and Gilmaire (*Reporter*) agreed.

Mr. Tuz (*Polish State Railways*) did not consider that steam trains were to be recommended, and preferred railcars.

Mr. Barrington-Ward (*London and North Eastern Railway*) wished to see mention made in the report of « push and pull » trains, which had given better results than railcars, and which offer advantages from the point of view of the utilisation of locomotives.

Mr. GIOVENE stressed the importance of one-man driving, specially studied safety devices being used.

After a discussion in which Messrs. DREYFUS *(French Midi Railways)*, MATTER (*Swiss Federal Railways*), BARRINGTON-WARD, GILMAIRE and GRANDJEAN *(Reporters)* took place a new text was adopted for Summaries 4, 5 and 6.

Summary 7 :

7. From the point of view of technical operation, it is recommended to simplify traffic regulations to the largest possible extent, and reduce the number of operations requiring the presence of operating employees. For this purpose, certain Railways have found it advisable to centralise the train control duties in selected stations or in dispatching offices.

Messrs. LATRASSE and DE SPIRLET thought that train control offices were an expensive solution.

Mr. PALMIERI indicated some Italian methods that enabled valuable economies to be made at secondary stations.

Mr. WILLOUHGBY (*Sudan Railways*) stressed the success of train control on colonial Systems.

The PRESIDENT and Mr. MATTER proposed to simply mention the existence of train control offices on certain Systems.

The PRESIDENT proposed an addition referring to shunting in stations by the train crew.

— Summary 7, thus amended, wa
adopted.

Summary 8 :

8. From the point of view of the com
mercial organisation of stations, th
advisability of adopting simplified m
thods of making out the charges, and
accountancy, should be stressed.

— Adopted without discussion.

Summary 9 :

9. Simplified methods of operatio
rates application and accountancy ma
it easier, wherever possible, to comm
the management of unimportant statio
to private individuals. Such « car
takers », bound to the railway by a co
tract, usually perform all station duti
except those relating to traffic safety.

Mr. LEVEL returned to the question
leasing out lines which were losing m
ney. He was supported by Mr. DELI
(*Société Générale des Chemins de
Economiques, France*) and Mr. JO
DAIN (*Chemins de fer secondaires
Nord-Est, France*). The question had
fact been raised in Mr. PALMIERI's qu
tionnaire.

The PRESIDENT pointed out that t
question belonged to Summary 2, wh
had already been adopted.

— Summary 9 was then adopted wi
out alteration.

Summary 10 :

10. Finally, it is advantageous to c
vert certain small stations or halts i
unstaffed establishments, tickets be
issued and collected by the train st
and the goods being forwarded or de
ered — when such places are open
goods traffic — as if such places w
private sidings.

This clause gave rise to a request for xplanations by Mr. MATTER, which were iven him by Messrs. GRANDJEAN, LA-RASSE and DEMARET (*Belgian National ailways Co.*).

— Summary 10 was adopted with a light modification.

The PRESIDENT thought it useful to liscuss again the question of leasing out ion-paying lines to local companies.

Messrs. LEVEL, BEGHIN (*Chemins de fer lépartementaux, France*) and JOURDAIN nsisted strongly that the possibility of btaining economies by such transfer be nentioned.

Messrs. MATTER, YOYITCH, BAUMANN *Deutsche Reichsbahn*), WILLOUGHBY, DE-ARET and PALMIERI were of a contrary pinion.

Finally the matter was put to the vote nd the Meeting pronounced in favour f retaining Summary 2 without any ddition.

The PRESIDENT stated that the following ummaries had been adopted :

Summaries.

« 1. The organisation of the different
services on secondary lines of main-line systems should have as its aim the
reduction of operating expenses to a
minimum.

« The fact should not be overlooked,
however, that it is essential to improve
the service of both passenger and
goods traffic as much as possible in
order to recover, at least in part, traffic lost to road competition.

« 2. The possibility of reducing the
« expenses must be sought in the field
« of technical installations, in the domain of the methods of transport and
« in the adoption of simplified operating
« methods.

« 3. Technical installations should be
« adapted to actual traffic requirements
« and not require any costly upkeep.

« Simplification of signalling, and even
« elimination of signals where possible,
« simplification of the operation of
« points and other appliances, discontinuation of guarding at certain level
« crossings, are all measures frequently
« adopted, which can be recommended
« with a view to effecting savings.

« 4. Substitution of more economical
« methods of transport for ordinary
« trains is one of the essential conditions
« for reducing expenses. From this
« standpoint, the use of light trains or
« railcars, when traffic conditions,
« either passenger or goods, are not
« against it, gives appreciable advantages.

« It is also advisable to restrict the
« number of classes in passenger coaches
« by abolishing first class and, where
« possible, also second class.

« 5. Light trains should be made up
« with the object of realising economical
« operation and utilisation. (For example « push and pull » trains driven
« from either end, and locomotives fitted
« for one-man operation.)

« 6. Railcars have undergone a very
« rapid development, which is worthy of
« being followed up . They have made it
« possible considerably to increase the
« commercial speeds, to increase the
« train frequency and the number of
« stops; in fact to greatly improve the
« working on secondary lines.

« It is desirable in certain cases that « railcars should be capable of being « coupled together or of pulling one or « more traillers.

« 7. From the point of view of technical « cal operation the greatest possible simplification « plification of traffic rules is recommended, « mended, also the reduction of the number « ber of stations at which operating movements « vements take place. To this end some « systems have found it useful to concentrate « centrate train control duties in selected « ed stations or in dispatching offices.

« It can also be advantageous to leave « station shunting movements to the « crew accompanying the train on secondary « dary lines if this results in a reduction « of the total personnel on the line.

« 8. From the point of view of the « commercial organisation of stations, « the advisibility of adopting simplified « methods of making out the charges, « and of accountancy, should be stressed.

« 9. Simplified methods of operation, « rates application and accountancy « make it easier, wherever possible, to « commit the management of unimportant « tant stations to private individuals. « Such « caretakers », bound to the railway « way by a contract, usually perform all « station duties except those relating to « traffic safety.

« 10. Finally, it is advantageous to « convert certain small stations or halts « into unstaffed establishments, tickets « being issued and collected by the train « staff, and the goods being forwarded « or delivered—when such places are « open to goods traffic—as if such places « ces were private sidings off the open « line. »

— The Plenary Meeting held on June 7th approved these summaries.

QUESTION VIII.

Application of rational organisatio (planning) to the transport of good

especially in connection with :

1. *the functions and internal workin of shunting yards;*

2. *the provision of inter-yard conne tions;*

3. *the estimation of the probable traff to be dealt with, and the provision of th trains required;*

4. *the information to be given to th consignees;*

5. *the acceleration of the turn-roun of empty stock;*

6. *the use of containers and road-ra wagons.*

Preliminary documents.

Report (Belgium and Colony, Luxen burg, Netherlands and Colonies, Fran and Colonies, Spain, Portugal and Col nies, Italy, Egypt), by J. COLLE. (S *Bulletin*, October 1936, p. 1027 or sep rate issue No. 3.)

Report (Great Britain, Dominions a Colonies, North and South Ameri China and Japan), by V. M. BARRINGTO WARD. (See *Bulletin*, November 19 p. 1113, or separate issue No. 4.)

Report (Germany, Austria, Bulgar Denmark, Finland, Greece, Hungary, N way, Poland, Rumania, Sweden, Czech slovakia, Turkey and Jugoslavia), by D Ing. A. BAUMANN. (See *Bulletin*, May 19 p. 1191, or separate issue No. 31.)

Special Reporter : Dr.-Ing. A. BAUMA (See *Bulletin*, June 1937, p. 1548.)

Report of Sections III and V combined.

(See *Daily Journal of the Session*, . 7, pp. 4 to 7, and No. 9, p. 1.)

Meeting held on June 9th, 1937.

The Meeting opened at 9.30 a. m., under e presidency of Mr. PELLARIN.

The PRESIDENT called upon Dr.-Ing. UMANN (*Special Reporter*).

The latter indicated that the Reporters re limited by the discussions which d taken place at preceding Congresses lethods of working goods trains, — adrid, 1930 — and Mechanisation of unting yards, — Cairo, 1933). Since ods services were organised on almost entical lines on all the Railways con-lted, it did not seem necessary to him proceed to a general discussion.

This proposal was supported by the ESIDENT, and the Section decided to amine chapter by chapter the summa-s proposed by the *Special Reporter*.

I. *Organisation of the service in shunting yards.*

Summary 1 :

. In a general way, care should be en that the organisation of train nting and marshalling work meets the rating requirements; there is already at uniformity in the principles gov-ing organisation of the work and the uence of the operations.

– After Mr. COLLE (*Reporter*) had rvened, the text was adopted without dification.

Summary 2 :

. The economical working of shunting ds depends first of all on the rational arrangement of the timetables. These should be drawn up so as to reduce to a minimum the time spent by wagons in the shunting yards; when the wagons are standing a very short time, better use is made of them and the number of wagons required is smaller. A proper succession of the trains, adapted to suit the capacity of the shunting yards, is also reflected in a better use of the shunting gangs and locomotives.

Mr. COLLE did not think that economical working of shunting yards depended primarily on the rational arrangement of the timetables.

Mr. RENARD (*French Est Railways*) indicated that there seemed to be contradiction between the wish to spend as little time as possible in shunting, and the desire to speed up the circulation of wagons.

Dr.-Ing. BAUMANN considered the influence of timetables predominent. It permits a quicker turn-round of the wagons.

— After a discussion, in which the PRESIDENT, Messrs. RENARD, WILLOUGHBY (*Sudan Railways*), LE BESNERAIS (*French Nord Railway*), BARRINGTON-WARD (*Reporter*) and BAUMANN took part, Summary 2 was adopted, after being amended.

Summary 3 :

3. As exact a plan as possible of the work to be done in the shunting yards and the way it is to be carried out should be drawn up, both as regards time and work. The staff and locomotives should be allocated in such a way as to ensure their economical use; a sufficient margin must be allowed for frequent abnormal demands, whereas for cases of special demands which rarely arise, the

plan must be departed from. The plan should provide for suitable connections between arriving and departing trains.

Messrs. Goursat (*French Nord Railway*), Renard, Le Besnerais and Colle asked for slight modifications to the text.

— The amended wording was adopted.

Summary 4 :

4. The establishment of a working plan pre-supposes a knowledge of the time required for the different operations and the amount of labour needed to carry them out; the diversity of the trains and the variable density of the traffic affect the working time and the labour required so much that the unit values calculated from the average number of trains are not always, and in fact are rarely, sufficient for planning the work. It is not possible to get the whole of the shunting operations to strictly follow a regular rhythm owing to the connections established by the timetables between the goods trains and the passenger trains. Consequently a satisfactory planning of the shunting operations must depend to a large extent on the particular circumstances of the moment.

Dr. Baumann had re-examined this summary with the others Reporters; they found that the wording was too general. One could speak of a regular rythm of certain shunting operations, but is was not possible to make a recommendation of this kind for the making up of trains. A new wording was proposed.

Messrs. Goursat and Renard mentioned applications of a type of planning to the making up of trains on their respective systems. They proposed that it should be noted in Dr. Baumann's revised text. The latter had no objection but he remarked that it would be well to be le categorical when dealing with marsha ling than when dealing with splitting u

— Summary 4 was adopted after bei amended so as to take into account t alterations suggested.

Summary 5 :

5. Mechanical equipment, rail brak and automatic point operation ha given excellent results in large shunti yards; the operations are speeded up a the efficiency of the yards increased. large Railways with heavy traffic, t train marshalling may thus be conce trated, the smaller yards especially junctions only dealing with wagons or from stations in their immedi neighbourhood.

Mr. Boistel d'Welles (*Paris-Orléa Railways*) remarked that the second p of the conclusion was not a conseque of the first part, and proposed the se ration of the texts.

Mr. Colle proposed a modification the text, which was adopted after disc sion with Messrs. Boistel d'Welles a Baumann.

Mr. Renard wanted to substitute words : « remotely controlled brakes for « track brakes ».

— Summary 5 was adopted with amended wording.

Mr. Goursat considered that it was sirable to further extend the organi tion of marshalling work; he proposed add a sixth summary to this end.

Dr. Baumann agreed to the addition this new clause (No. 6) which was mitted by the Section.

Train services between marshalling yards.

Summary 1 :

1. If fast working is to be obtained, an sential condition is that marshalling rds be interconnected by trains ich are not required to serve inter- ediate stations.

— Adopted without discussion.

Summary 2 :

2. If the traffic arrives in sufficient antities, it is recommendable to work through to distant receiving sta- ns, avoiding intermediate shunting rds, provided the time taken to collect wagons in the shunting yard be- e departure is shorter than the time be saved on shunting and marshalling intermediate shunting yards.

— Adopted with a slight modification.

Summaries 3 and 4 :

. If the quantities of wagons to be warded are small, so that the time uired to collect a sufficient number direct despatch to the most distant eiving station is too long, by making lots of wagons which arrive at the nting yard and marshalling them as y are into a train made up therein, the work to be done can be completed quickly or even more quickly if the e to collect them is appreciably rter.

. There should be enough regular ns to work the traffic experience ws may be expected, and to obtain, good transfer possibilities, satisfac- y through train workings in the case ong-distance goods traffic.

– Adopted without debate.

Summary 5 :

5. The optional trains required should be made known as quickly as possible in order to avoid delays in the conveyance of goods, avoid interfering with the working of the stations by blocking them up, and to make good use of the locomotives and staff required to work the optional trains. The timetables for the optional trains should be prepared at the same time as those of the regular trains and be inserted in the working timetables.

— Adopted with a slight alteration.

Summary 6 :

6. The organisation of the special trains should not be left to the stations but be dealt with by a central office (traffic control, dispatcher) having wider jurisdiction.

Mr. MATTER thought that this clause applied especially to large Systems with dense traffic. The wording was amended on the intervention of Messrs. BARRINGTON-WARD and RENARD in order to take into account the remarks made.

III. *Estimation of the traffic to be dealt with and trains required.*

Summary 1 :

1. As regards the probable general trend of the traffic and the important individual loads, it is only possible to form an opinion some time beforehand by keeping in close contact with the consignors, by taking into account previous experience, by railway and economic statistics and — a relatively short time ahead — by the demands for empty stock; there is no standard method of solving these problems.

— Adopted with a slight modification to the form of the French wording. The English text remained unaltered.

Summary 2 :

2. In the case of consignments already handed in for despatch, there are preliminary advice methods, either between despatching and receiving stations and marshalling yards, or through the medium of central offices which notify the information received from the departure stations to the other stations concerned and, in some cases, to neighbouring Railways.

— Adopted without discussion.

IV. *Advice to be given to the consignees.*

Summary 1 :

1. Nearly everywhere the consignee is advised of the arrival of his goods and of the fact that they are ready for off-loading, so that the wagons, sidings, and loading platforms can be made available again as quickly as possible.

— Adopted.

Summary 2 :

2. No account is taken of the fact that the consignee, according to general practice, is informed by the consignor of the day and hour of departure and consequently can calculate the probable day and hour of arrival, from his own experience or with the help of a goods train timetable or similar documents.

Mr. COLLE reported that some Railways had sought to remove uncertainty as to the date and hour of arrival of a consignment.

Mr. GOURSAT wished to see this problem studied, owing to competition from lorries, which always gave this information.

Dr. BAUMANN wished to retain the proposed wording, which described a general rule, but he saw no objection to it bein
completed in the way asked for.

— Summary 2 was adopted with th
addition proposed by Mr. GOURSAT.

Summary 3 :

3. When the demands for wagons a
heavy, the advice notice — together wi
the intimation that the period with
which the goods are to be unloaded
shortened — if need be — is particular
important; the preliminary advice, b
the last station of call to the receivi
station, of the probable time of arriv
of goods of some importance is to
recommended.

— Adopted without alteration.

V. *Acceleration of the turn-round of empty stock.*

The turn-round of empty stock
accelerated by the following metho
the application of which depends on t
particular conditions of the railway c
cerned and the kind of traffic worke

(*a*) Concentration of the empty w
gons at large collecting centres fro
which they can be distributed to t
consuming points;

(*b*) Working empty stock towards t
regions generally short of wagons wi
out special demands having to be ma

(*c*) Working the wagons in spe
empty-stock trains, which do not sh
in the marshalling yards and avoid
unnecessary stops. These very li
trains are formed with the maxim
number of axles and their timings ada
ed to the small weight hauled;

(*d*) Authority to reduce the load
empty-stock trains and loaded-wa
trains below the nominal value w
there are heavy demands for roll
stock, and so reduce the turn-rou
times in a general way; at the sa
time, loading points served more

uently, and users given a preliminary dvice of the time the loaded or empty agons will be at their disposal.

Mr. MATTER pointed out that para- raphs (*a*), (*b*) and (*c*) dealt with nor- al traffic, but section (*d*) dealt more specially with the case of lack of rolling tock; in this latter case, there were still ther methods which could be applied uccessfully.

After a discussion between Messrs. AUMANN, MATTER, the PRESIDENT and Ir. GOURSAT, the wording of paragraph *d)* was slightly modified; paragraphs *a)*, *(b)* and *(c)* remained unaltered.

VI. *Use of containers and road-rail wagons.*

Summary 1 :

1. Very few Railways have left the xperimental stage as regards the use f containers. It appears that the ques- ons of the rates and conveyance bet- een the railway and the consignor's consignee's premises can be solved tisfactorily.

Dr. BAUMANN pointed out that the use f large containers was limited to large ailway Systems which had their own llection and delivery services. He pro- osed to complete Summary 1 in conse- uence.

— The summary was adopted with an nended wording.

Summary 2 :

2. In many cases the use of the large ntainer is still hampered by the diffi- ulty of transferring it from the wagon the lorry and inversely, owing to the ck of suitable cranes, and the fact that her simple means of transfer between the two means of transport have not yet been perfected. Small containers used for parcels and special small consignments appear to be advantageous, especially from the point of view of the reduction of transhipment operations.

Dr. BAUMANN drew attention to the favourable results obtained, in England and the United States, with mobile cranes running on the road, for handling the containers.

Messrs. RENARD and GOURSAT remarked that it was primarily the difficulty of handling at the customer's premises that retarded the more general use of containers.

— Summary 2 was split up; the first half was modified to take these findings into account; the second half became Summary 3, which was adopted with a small addition proposed by Mr. RENARD.

Summary 3 of the Special Report :

3. Undoubtedly, the use of containers for door to door transport has an extremely favourable influence on the ability of the railway to meet competition.

— Adopted without discussion as No. 4 of the final summaries.

Summary 4 of the Special Report :

4. Road transport of railway wagons is only at present in use on a very few Railways. Although it has been used on a fairly large scale with good results, no definite judgment can be formulated on the subject as yet.

Mr. GIOVENE (*Italian State Railways*) indicated that successful trials had been made by the Italian Railways, who proposed to develop the system consisting in loading the wagon unto a road vehicle.

The summary was altered, as a consequence.

Mr. JOURDAIN (*Chemins de fer secondaires du Nord-Est, France*) drew attention to the method of loading a lorry or trailer on railway wagons.

It was decided to mention this possibility in Clause 5, which was adopted.

In closing the Meeting, the PRESIDENT complimented Dr. BAUMANN, the *Special Reporter*, on the remarkable work he had presented.

He then stated that the summaries had been approved with the following wording :

Summaries.

I. Organisation of the service in shunting yards.

« 1. In a general way, care should be
« taken that the organisation of train
« shunting and marshalling work meets
« the operating requirements; there is
« already great uniformity in the prin-
« ciples governing organisation of the
« work and the sequence of the opera-
« tions.

« 2. The economical working of shun-
« ting yards is strongly influenced by the
« rational arrangement of timetables.
« These should have as their object, on
« the one hand, the reduction to a mini-
« mum of the time spent by wagons in
« the shunting yards (when the wagons
« are standing a very short time, better
« use is made of them and the number
« of wagons required is smaller) and, on
« the other hand, the attainment of a
« proper succession of the trains, adapt-
« ed to suit the capacity of the shunting
« yards, which is also reflected in a bet-
« ter use of the shunting gangs and loco-
« motives.

« 3. As exact a plan as possible of the
« work to be done in the shunting yards
« and the way it is to be carried ou
« should be drawn up, both as regards
« time and work. The staff and locomoti-
« ves should be allocated in such a way
« as to ensure their economical use; a suf
« ficient margin must be allowed for fre
« quent abnormal demands, whereas fo
« cases of special demands which rarel
« arise, the plan must be departed from
« The plan should provide for suitabl
« connections between arriving and de
« parting trains.

« 4. The establishment of a workin
« plan pre-supposes a knowledge of th
« time required for the different opera
« tions and the amount of labour neede
« to carry them out.

« The carrying out of an existing pla
« does not usually lead to any difficult
« in splitting up the trains, as long a
« the traffic is sufficiently dense.

« When making up trains, on the con
« trary, the diversity of the trains an
« the variable density of the traffic a
« fect the working time so much th
« the unit values calculated from the av
« rage number of trains are, as yet, on
« rarely sufficient for planning t
« work.

« Thus a regular and uniform rhyth
« of shunting operations has, up to t
« present, only been realised in exce
« tional cases.

« Consequently a satisfactory planni
« of the shunting operations must d
« pend to a large extent on the particul
« circumstances of the moment.

« 5. Mechanical equipment, remote
« controlled brakes, and automatic poi
« operation have given excellent resu
« in large shunting yards; the operatio
« are speeded up and the efficiency
« the yards increased.

« On large Railways with heavy traffic, it is possible to concentrate in large marshalling yards the work of making up trains, reducing as much as possible the work at small yards, and especially at junction stations.

« 6. The study of the organisation of marshalling yards has generally been less developed than that of splitting up yards. Since the work of making up trains is that which involves the greatest expense in machines and locomotives, it is desirable that Administrations should study the most economical methods of making up trains, taking into account the preparatory work which can be done at the time of splitting up, thanks to a judicious allotment of tracks.

Train services between marshalling yards.

« 1. If fast working is to be obtained, an essential condition is that marshalling yards be interconnected by trains which are not required to serve intermediate stations.

« 2. If the traffic arrives in sufficient quantities, it is recommendable to work it through to distant receiving stations, avoiding one or more intermediate shunting yards, provided the time taken to collect the wagons in the shunting yard before departure is shorter than the time to be saved on shunting and marshalling in intermediate shunting yards.

« 3. If the quantities of wagons to be forwarded are small, so that the time required to collect a sufficient number for direct despatch to the most distant receiving station is too long, by making up lots of wagons which arrive at the shunting yard and marshalling them as they are into a train made up therein, all the work to be done can be completed as quickly or even more quickly if the time to collect them is appreciably shorter.

« 4. There should be enough regular trains to work the traffic experience shows may be expected, and to obtain, by good transfer possibilities, satisfactory through train workings in the case of long-distance goods traffic.

« 5. The intended running of optional trains should be made known as quickly as possible in order to avoid delays in the conveyance of goods, avoid interfering with the working of the stations by blocking them up, and to make good use of the locomotives and staff required to work the optional trains. The timetables for the optional trains should be prepared at the same time as those of the regular trains and be inserted in the working timetables.

« 6. It is recommended that the organisation of the running of special trains, on large Systems with dense traffic, should not be left to the stations but should be entrusted to a district office (traffic control, dispatcher) having wider jurisdiction.

III. *Estimation of the traffic to be dealt with and of the trains required.*

« 1. As regards the probable general trend of the traffic and the important individual loads, it is only possible to form an opinion some time beforehand by keeping in close contact with the consignors, by taking into account previous experience, by railway and economic statistics and — a relatively short time ahead — by the demands for empty stock; there is no standard method of solving these problems.

« 2. In the case of consignments al-
« ready handed in for despatch, there are
« preliminary advice methods, either
« between despatching and receiving sta-
« tions and marshalling yards, or through
« the medium of central offices which
« notify the information received from
« the departure stations to the other sta-
« tions concerned and, in some cases, to
« neighbouring Railways.

IV. *Advice to be given to the consignees and consignors.*

« 1. Nearly everywhere the consignee
« is advised of the arrival of his goods
« and of the fact that they are ready for
« off-loading, so that the wagons, sidings,
« and loading platforms can be made
« available again as quickly as possible.

« 2. In advising the consignee, no ac-
« count is taken of the fact that, accor-
« ding to general practice, he is inform-
« ed by the consignor of the day and
« hour of departure and consequently
« can calculate the probable day and
« hour of arrival, from his own expe-
« rience or with the help of a goods train
« timetable or similar documents.

« Because of the active competition of
« the road motor car, it seems important
« for Railway Administrations to exa-
« mine the possibility of advising the
« consignor as soon as possible of the
« probable date of arrival of the goods.

« 3. When the demands for wagons
« are heavy, the advice notice — together
« with the intimation that the period
« within which the goods are to be un-
« loaded is shortened — if need be — is
« particularly important; the prelimi-
« nary advice, by the last station of call
« to the receiving station, of the proba-
« ble time of arrival of goods of some
« importance, is to be recommended.

V. *Acceleration of the turn-round of empty stock.*

« The turn-round of empty stock
« accelerated by the following metho
« the application of which depends
« the particular conditions of the Ra
« way concerned and the kind of traf
« worked :

« *(a)* Concentration of the empty w
« gons at large collecting centres fr
« which they can be distributed to t
« consuming points;

« *(b)* Working empty stock towa
« the regions generally short of wago
« without special demands having to
« made;

« *(c)* Working the wagons in spec
« empty-stock trains, which do not shu
« in the marshalling yards and avoid
« unnecessary stops. These very lig
« trains are formed with the maxim
« number of axles and their timi
« adapted to the small weight hauled;

« *(d)* At times of great demand
« rolling stock, in order to reduce
« turn-round time of the wagons, aut
« rity to reduce the load of trains bel
« the nominal value, increased serv
« of loading points, extension of work
« hours at stations and the prelimin
« notification to customers of the ti
« that empty wagons will be at their d
« posal.

V. *Use of containers and road-rail wagons.*

« 1. Only some Railways, especia
« those with their own collection a
« delivery services, have left the expe
« mental stage as regards the use of c
« tainers. It appears that the questi
« of the rates and conveyance betw
« the railways and the consignor's

consignee's premises can be solved satisfactorily.

« 2. It is specially important in the case of large container traffic, to suitably arrange the transfer from road to rail vehicles and inversely. Especially useful for this purpose are mobile cranes, which run on the road alongside the railway wagons and economise on all shunting operations. Difficulties in the use of large containers can mostly be traced to the lack of such mobile cranes or other powerful unloading equipment, at stations and on the premises of consignors and consignees.

« 3. Small containers used for parcels and special small consignments appear to be advantageous, especially from the point of view of the reduction of transhipment operations, and to facilitate handling.

« 4. Undoubtedly, the use of containers for door to door transport has an extremely favourable influence on the ability of the railway to meet competition.

« 5. Road transport of railway wagons is only at present in use on a few Railways. The use, by some Railways, of special road vehicles for carrying railway wagons has given satisfactory results. Nevertheless, the time has not yet come for formulating a definite judgment.

« One can also consider, in order to ensure « door to door » transport, the use of lorries or trailers loaded unto railway wagons at the nearest station to the sending establishment and unloaded similarly at the nearest station to the receiving establishment. »

— The Plenary Meeting held on June th ratified these summaries.

QUESTION IX.

Results obtained from the automatic and distant operation of signals and points, and from locomotive cab signals.

Preliminary documents.

Report (France and Colonies, Great Britain, Dominions and Colonies, Belgium and Colony, Luxemburg, America, China and Japan), by J. Tuja and A. Lemonnier. (See *Bulletin*, January 1937, p. 137 or separate issue No. 15).

Report (Italy, Switzerland, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt, Spain, Portugal and Colonies), by Carlo Bellomi and Gino Minucciani. (See *Bulletin*, April 1937, p. 789, or separate issue No. 25.)

Report (Austria, Czechoslovakia, Denmark, Finland, Germany, Hungary, Netherlands and Colonies, Norway, Poland, Sweden), by A. Miszke. (See *Bulletin*, April 1937, p. 1089, or separate issue No. 29).

Special Reporters : Messrs. Tuja and Lemonnier. (See *Bulletin*, June 1937, p. 1562.)

Report of Sections II and III combined.

See *Daily Journal of the Session*, No. 8, pp. 1 to 4, and No. 9, p. 1.)

Meeting held on June 10th, 1937.

The Meeting was opened at 9.30, under the presidency of Mr. Pellarin, who called on Mr. Tuja *(Special Reporter)*.

Mr. Tuja regretted the absence of his colleague, Mr. Lemonnier, who was unable to be present in consequence of a recent accident; he asked the Assembly to join him in wishing Mr. LEMONNIER a speedy recovery.

He then gave a short summary of the special report, in which he endeavoured to outline some general ideas on the following points : automatic block, power boxes, and cab signals.

The Meeting then proceeded with the discussion of the summaries proposed by the *Special Reporters*.

Summary 1 :

1. The automatic block, on heavily loaded lines, is an excellent means of providing adequate headway between trains running in the same direction, as regards both safety and the capacity of the line.

— Adopted without debate.

Summary 2 :

2. The block signal at « danger » should generally necessitate the train being brought to a standstill.

It appears advantageous, however, to allow certain heavy trains to run past certain block signals at danger, on steep rising gradients, without stopping.

A discussion arose between Messrs. BOUND *(London Midland & Scottish Railway)*, MISZKE *(Reporter)*, Col. MOUNT *(Ministry of Transport, Great Britain)*, Messrs. TUJA, the PRESIDENT and PALMIERI *(Italian State Railways)*, on the question as to whether permission to pass certain block signals at « danger » should be limited to heavy goods trains, or not.

— The wording of the conclusion was slightly modified, as a consequence.

Summary 3 :

3. After stopping (or exceptionally without stopping as mentioned above) the danger indication of the block signal should mean that the driver is to proceed with caution. There appears to be no objection to the train restarting immediately without further ado, as is done on many Railways.

— Adopted without discussion.

Summary 4 :

4. A driver proceeding with caution when he has met a block signal at « danger » should run « at sight », i. e. at such a speed that at any moment he can stop on the length of line in sight.

Some Railways require the driver, in addition to running at sight, not to exceed a given hourly speed. It may be questioned whether this speed limit, besides some advantages, has no drawbacks. In any case, it can be dispensed with.

Mr. JOLY *(Metropolitan Railway, Paris)* gave particulars about the practice on the Paris Metropolitan Railway.

A discussion took place between the PRESIDENT, Messrs. TUJA, Col. MOUNT, CANCELA DE ABREU *(Ministry of Commerce and Communications, Portugal)*, BATECLE *(Ministry of Public Works, France)*, LEMAIRE *(Belgian National Railways Co.)*, SHERRINGTON *(London & North Eastern Railway)* and LATRASSE *(French Nord Railway)* on the question as to whether a speed limit should be imposed when running « at sight ».

— Summary 4 was modified to take the result of the discussion into account.

Summary 5 :

5. In short sections at least (not exceeding 3 km. = 1.9 miles) a good

ethod of protecting trains stopped on he open road is to rely on the block nd not to require the staff on these rains to resort to additional protective easures (except in case of derailment).

A discussion took place between Messrs. BARYSZ *(Polish State Railways)*, TUJA, LE BESNERAIS *(French Nord Railway)*, BATICLE, BOUND and PALMIERI on he circumstances in which it was desirble to provide special protection for a rain stopped on the open line.

— Summary 5 was somewhat altered s a consequence of this discussion.

Summaries 6, 7, 8 and 9 :

6. In the case of the automatic block ith mechanical signals, some Railways onsider it prudent to provide a « connuity » device which maintains a block gnal at « danger » after the correspondng section has been cleared, in the exceptional case in which the following lock signal has not gone to « danger » fter a train has passed.

This measure gives certain guarantees ut has some drawbacks. The best soution appears therefore to use light gnals instead of mechanical signals henever possible.

7. Whatever type of signal be used, ven in the case of light signals, some ailways deem it necessary to take preutions (double relays, or continuity evices) against the exceptional case of block relay not becoming de-energised hen a train has passed, whereas other ailways, chiefly to reduce the number times the block signals unduly go to danger », take no such additional preutions.

The essential thing is to use excellent lays only.

8. The coded block, although in use ly a short time, appears to be a partilarly safe form of automatic block.

9. Conditions under which light vehicles as well as vehicles with pneumatic tyres can be allowed to run over automatic block sections with safety still require investigation.

— Adopted without alteration.

Summary 10 :

10. Power boxes with route levers, in which one lever operates the whole of the points and signals on a route, appear to specially facilitate the working.

Mr. PALMIERI wished to make clear what should be done in stations where movements are frequent.

— The text, amended by the PRESIDENT and Mr. TUJA so as to take this remark into account, was adopted.

Summary 11 :

11. At the present time there is a tendency to use very small (miniature) levers and replace the interlocking properly speaking i. e. locking the levers into position, by directly cutting the operating circuit of the apparatus in question by means of a relay. These new methods seem to be at least as safe as those used in power boxes of other types.

Mr. OLIVIER *(Belgian National Railways Co.)* asked for the last sentence to be deleted. This deletion was adopted.

Mr. LE BESNERAIS, however, insisted on the fact that no depreciatory sense was to be given to this deletion.

Summaries 12, 13, 14 and 15 :

12. Power boxes lend themselves particularly well to providing all the safety conditions that can be desired. It is to be recommended that provision be made in these boxes for section locking,

point locking, route locking, and approach locking.

13. Issuing instructions covering the failures of electric devices preventing point or signal movements in a power box is a delicate question. The trains affected should not be allowed to pass at speed the whole time the device is out of order. It is recommended, moreover, that any electric interlocking out of order should be cancelled by the signalmen, and « repeater » devices used each time the defective equipment is operated.

14. Long-distance point operation, by means of devices with few control circuits and operating circuits, gives excellent results and appears likely to be developed considerably, in particular for operating single-track lines with heavy traffic, as it may make it unnecessary to double such lines.

15. Automatic point operation by the trains themselves also gives good results, at least with simple track layouts.

— Adopted without modification.

Summary 16 :

16. It is desirable to facilitate the work of the driver by equipping the engines with signal repeating devices or with continuous signalling; automatic braking can be added with either arrangement.

This equipment is specially desirable on busy lines or lines run over by high-speed trains.

Mr. MÜLLER *(Swiss Federal Railways)* pointed out that in the report drawn up by Messrs. BELLOMI and MINUCCIANNI it is stated that no Railway had given a reply concerning signal repetition on locomotives and automatic braking. The Swiss Federal Railways had equipped all their electrified lines with this type of apparatus. It was due to an oversight that their answer did not reach the Reporters in time.

— Summary 16 was adopted in a slightly altered form.

Summary 17 :

17. Steps should be taken to prevent the driver becoming less vigilant when such equipment is provided.

— Adopted.

Summary 18 :

18. Distant signals (warning and spee restriction) in the danger positio should be repeated. It is also useful t repeat these signals when off.

After a discussion between Messrs MÜLLER, TUJA, PALMIERI and PONCE *(French Est Railways)* this summar was adopted with slight alterations.

Summary 19 :

19. Cab signalling equipment with pu rely mechanical transmission of the ind cations is only suitable for trains run ning at low speeds.

— Adopted without debate.

Summary 20 :

20. Equipment with electro-mechani al (contact) transmission should pref rably give the « danger » indication b cutting off the current.

If, on the contrary, it gives the « da ger » indication by emitting current, must be maintained in very good orde

Messrs. BARYSZ and PALMIERI propos to delete the second paragraph. Mr. Po CET pointed out a detail.

— Summary 20 was adopted, the s cond paragraph being deleted.

Summary 21 :

21. Non-contact devices are definitely etter than those working by contact.

— Adopted.

Summary 22 :

22. It is desirable as a rule to retain e permanent-way signals, even when b signals are fitted on all the loco- otives running on the line.

Mr. Bound asked for a change in the aglish wording.

— Adopted.

Summary 23 :

23. There does not appear to be any sadvantage in giving one more indi- tion on the engines than those given the permanent-way signals (advance arning, for example). This is particu- rly valuable in the case of a section of ie run over by some ultra-fast trains which the permanent-way signalling s become inadequate.

— Adopted after a discussion between essrs Le Besnerais, Tuja, Bocquet *(Pa- s-Lyon-Méditerranée Railways)*, Palmie- Bound and Japiot *(Paris-Lyon-Médi- rranée Railways)*.

Summaries 24 and 25 :

24. Undoubtedly, from the working int of view, and also to some extent om that of safety, continuous signalling better than signal repeating, even with n-contact apparatus.

25. Continuous signalling is much ore costly than signal repeating, even the case of non-contact apparatus, ıen the line is not already equipped th the automatic block. This system, erefore, can only be considered by railways already equipped or to be equipped with the automatic block on a large scale.

The Railways which for come reason or other are not proposing to install the automatic block on a large scale are rather led to adopt signal repetition preferably by means of non-contact equipment.

— Adopted, the form of Summary 24 being somewhat altered.

Summary 26 :

26. Automatic braking limited to home signals passed at « danger » raises no difficulty in principle, but is only suitable for lines run over at low speeds.

— After an intervention by Col. Mount, the last words were modified.

Summary 27 :

27. On lines run over at high speeds, the brakes should be applied automatically at the distant signal. The application of the brakes can be independent of train speeds or depend thereon.

— Adopted.

Summary 28 :

28. Automatic braking independent of the train speed always involves the provision of means by which the driver can cut out the automatic action when he has sighted the signal. Under these conditions automatic braking appears to be superior to signal repeating only in the very exceptional case of both driver and fireman being unable to operate the brake.

Mr. Müller wished to see the case mentioned in which only one man was on the engine. Mr. Bound pointed out that in England, about 4 000 kilometres (2 500 miles) of line were equipped with a system of automatic braking which gave good results.

— Summary 28 was altered accordingly.

Summary 29 :

29. Automatic braking depending on the train speed is more valuable than the former, especially in the case of ultra-high speed trains; it is incontestably of lower value when the engines are equipped with cab signals.

— Adopted without discussion.

Mr. LE BESNERAIS, on behalf of the Assembly, thanked Mr. PELLARIN for the way he had conducted the debate. The latter passed on this praise to the *Reporter*, Mr. TUJA, whose summaries had been adopted without giving rise to any long discussions.

Summaries.

Automatic block.

« 1. The automatic block, on heavily
« loaded lines, is an excellent means of
« providing adequate headway between
« trains running in the same direction,
« as regards both safety and the capacity
« of the line.

« 2. The block signal at « danger »
« should generally necessitate the train
« being brought to a standstill.

« Nevertheless, in certain exceptional
« and justified cases, steps can be taken
« to avoid enforcing a stop on certain
« heavy trains at some block signals at
« danger, on very heavy rising gradients.

« 3. After stopping (or exceptionnally
« without stopping as mentioned above)
« the « danger » indication of the block
« signal should mean that the driver is
« to proceed with caution. There ap
« pears to be no objection to the trai
« restarting immediately without fur
« ther ado, as is done on many Railways

« 4. A driver proceeding with cautio
« when he has met a block signal a
« « danger » should run « at sight »
« i. e. at such a speed that at any mo
« ment he can stop on the length of lin
« in sight.

« Some Railways have found it advan
« tageous to require the driver in addi
« tion to running at sight, not to excee
« a given speed.

« 5. In short sections at least (not ex
« ceeding 3 km. = 1.9 miles) a goo
« method of protecting trains stopped o
« the open road is to rely on the bloc
« and not to require the staff on thes
« trains to resort to additional prote
« tive measures (except in certain parti
« cular cases laid down by the railwa
« regulations).

« 6. In the case of the automatic bloc
« with mechanical signals, some Rai
« ways consider it prudent to provid
« a « continuity » device which main
« tains a block signal at « danger » afte
« the corresponding section has bee
« cleared, in the exceptional case i
« which the following block signal ha
« not gone to « danger » after a trai
« has passed.

« This measure gives certain guarante
« but has some drawbacks. The best s
« lution appears, therefore, to use lig
« signals instead of mechanical signa
« whenever possible.

« 7. Whatever type of signal be use
« even in the case of light signals, so
« Railways deem it necessary to take pr
« cautions (double relays, or continui
« devices) against the exceptional ca

of a block relay not becoming de-energised when a train has passed, whereas other Railways, chiefly to reduce the number of times the block signals unduly go to « danger », take no such additional precautions.

« The essential thing is to use excellent relays only.

« 8. The coded block, although in use only a short time, appears to be a particularly safe form of automatic block.

« 9. Conditions under which light vehicles as well as vehicles with pneumatic tyres can be allowed to run over automatic block sections with safety still require investigation.

Power boxes.

« 10. Power boxes with route levers, in which one lever operates the whole of the points and signals on a route, appear to specially facilitate the working, provided they contain apparatus which lends itself to all kinds of train movements.

« 11. At the present time there is a tendency to use very small (miniature) levers and replace the interlocking properly speaking i. e. locking the levers into position, by directly cutting the operating circuit of the apparatus in question by means of a relay.

« 12. Power boxes lend themselves particularly well to providing all the safety conditions that can be desired. It is to be recommended that provision be made in these boxes for section locking, point locking, route locking, and approach locking.

« 13. Issuing instructions covering the failures of electric devices preventing point or signal movements in a power box is a delicate question. The trains affected should not be allowed to pass at speed the whole time the device is out of order. It is recommended, moreover, that any electric interlocking out of order should be cancelled by the signalmen and « repeater » devices used each time the defective equipment is operated.

« 14. Long-distance point operation, by means of devices with few control circuits and operating circuits, gives excellent results and appears likely to be developed considerably, in particular for operating single-track lines with heavy traffic, as it may make it unnecessary to double such lines.

« 15. Automatic point operation by the trains themselves also gives good results, at least with simple track layouts.

Locomotive cab signalling.

« 16. It is desirable to facilitate the work of the driver by equipping the engines with signal repeating devices or with continuous signalling; automatic braking can be added with either arrangement.

« This cab equipment is mainly required on busy lines or lines run over by high-speed trains.

« 17. Steps should be taken to prevent the driver becoming less vigilant when such equipment is provided.

Signal repetition.

« 18. Distant signals (warning and speed restriction) should be repeated and registered on the locomotive. It is also useful, in order regularly to verify that the apparatus is in working order, to repeat and register these signals when off.

« 19. Cab signalling equipment with « purely mechanical transmission of the « indications is only suitable for trains « running at low speeds.

« 20. Equipment with electro-mecha- « nical (contact) transmission should « preferably give the « danger » indica- « tion by cutting off the current.

« 21. Non-contact devices are defini- « tely better than those working by con- « tact.

Continuous signalling on the locomotive.

« 22. It is desirable as a rule to retain « the fixed (way-side) signals, even « when cab signals are fitted on all the « locomotives running on the line.

« 23. There does not appear to be any « disadvantage in giving one more indi- « cation on the engines than those given « by the fixed (way-side) signals (ad- « vance warning, for example). This is « particularly valuable in the case of a « section of line run over by some ultra- « fast trains for which the permanent- « way signalling has become inadequate.

Comparison.

« 24. From the working point of view, « and also to some extent from that of « safety, continuous signalling is better « than signal repeating, even with non- « contact apparatus.

« 25. Continuous signalling is much « more costly than signal repeating, even « in the case of non-contact apparatus, « when the line is not already equipped « with the automatic block. This sys- « tem, therefore, can only be considered « by railways already equipped or to be « equipped with the automatic block on « a large scale.

« The Railways which for some reason « or other are not proposing to install « the automatic block on a large scal « are rather led to adopt signal repeti- « tion, preferably by means of non-con- « tact equipment.

Automatic braking.

« 26. Automatic braking limited t « home signals passed at « danger » rai « ses no difficulty in principle, but i « only suitable for lines that are not ru « over by high-speed trains.

« 27. On lines run over at high speeds « the brakes should be applied automa « tically at the distant signal. The appli « cation of the brakes can be indepe « dent of the train speeds or depend th « reon.

« 28. Automatic braking independe « of the train speed involves the prov « sion of means by which the driver ca « cut out the automatic action when h « has sighted the signal. Consequent « this braking is especially superior « signal repetition alone and continuo « cab signalling alone, in the event of t « total incapacity of the engine crew.

« 29. Automatic braking depending « the train speed is more valuable th « the former, especially in the case « ultra-high speed trains; it is inconte « tably of lower value when the engin « are equipped with cab signals. »

— The Plenary Meeting held on Ju 11th approved these summaries.

4th SECTION. — General.

President : Dr.-Ing. A. Wasiutyński.
ice-Presidents : W. H. Barnes, G. Panaitopol, Dr. D. Fezas Vital, and Demaret.
Principal Secretary : A. Allard.

QUESTION X.

Effects of the world crisis and road competition on the railway position.
rresponding changes in railway commercial policy.

Preliminary documents.

Report (Four main-line Railways of
eat Britain — affiliated to the Inter-
tional Railway Union [U. I. C.] — and
in-line Railways of all other countries,
t affiliated to the International Rail-
y Union), by Mr. Ashton Davies. (See
lletin, February 1937, p. 309, or sepa-
e issue No. 17.)

Report (All main-line Railways affili-
d to the International Railway Union
. I. C.], except the four British main-
e Railways), by Dr. Cottier and Dr.
ierenberg. (See *Bulletin,* April 1937,
1109, or separate issue No. 30.)

Report (All secondary Railways), by
ssrs. La Valle and Mellini. (See *Bul-*
n, May 1937, p. 1209, or separate issue
32.)

pecial Reporter : Dr. Cottier. (See
lletin, June 1937, p. 1571.)

Report of Section IV.

See *Daily Journal of the Session,*
2, pp. 5 to 7; No. 3, p. 6; No. 4, pp. 4
t 5; No. 6, pp. 5 and 6; No. 7, p. 8;
9, p. 1.)

Meeting held on June 2nd, 1937.

The President calls upon Dr. Cottier (*Special Reporter*).

Dr. Cottier first of all spoke with very great emotion about his co-reporter Dr. Von Beck, who died at the end of last year, and the Meeting stood in silence for 2 minutes to associate themselves with this tribute.

Dr. Cottier then reminded the Members of the previous reports on the world crisis and road competition and also the three reports made up on the occasion of the present Congress; he then briefly expounded the question as hereafter :

The world crisis, which began about 1929, became less severe in 1933, and in most countries industrial production curves, followed with a small delay by commercial curves, shew in some cases a marked increase, and in all cases an appreciable one.

The working coefficient did not, however, increase, as although receipts benefited by better economic conditions, the expenditure has increased under pressure of increased wages of staff and other factors. The deficit has necessitated the intervention of the State by means of subsidies.

The number of motor vehicles has not stopped increasing and their competitive power has also increased; in view of these facts the railways have not been able to benefit completely by the economic revival.

The railways have endeavoured to reduce expenditure; as regards long-distance traffic and bulk traffic, they remain the backbone of transportation; other methods of transport have each their part to play.

The State, however, has not always understood the importance of the question. Owing to the control imposed on the railways by the State, free competition has been hindered. On account of the public nature of the services rendered by the railways they have served a certain policy. Construction requires large capital, the remuneration of which is sometimes very slight.

Tariff systems have the effect of making the financial position of the railways dependent on the economic policy of the Governments.

What must be done ? How can individual traffic be incorporated in public transport? How can railway traffic be guaranteed against road transport?

The system of licences does not seem to have brought about sufficient protection. The best solution would be some sort of monopoly. There is, moreover, the question of « national defence », which must not increase the fleet of motor vehicles beyond measure.

The railway companies will try to increase their patronage by means of modernisation of their administration and working methods as well as by increasing the comfort, speed and lightness of the rolling stock, whereas the railcar question still raises several queries.

— Dr. COTTIER then read the provisional summaries of his report, explaining that they do not represent the condensation of the conclusions of the other re
porters, but were in fact his own view

Mr. MELLINJ *(Reporter)* pointed ou
that, as the *Special Reporter*, Dr. COTTIE
presented his own summaries, the latt
ought to be completed by adding the r
marks made by the other Reporters. A
exchange of views then took place, an
on the suggestion of the PRESIDENT,
was decided that the Reporters wou
meet as a special Committee in order
come to an agreement as to the substan
and the form of the summaries to
presented to the Congress. These sur
maries would be discussed in the cour
of the Meeting on June 3rd.

The PRESIDENT then proposed to pr
ceed with and conclude the general di
cussion.

Mr. JOURDAIN (*Chemins de fer seco
daires du Nord-Est, France*) drew atte
tion on the altered French policy wi
regard to rail and road transport co-or
nation. Whereas the 1934-1935 regu
tions tended towards an agreement b
tween railways and road carriers, ex
rience has shown the futility of effo
in this direction, and the complaints
the users incited the present Governme
to direct its efforts towards a system
authorizations (licences), and the Cou
cil of State appeared to have alrea
moved in this direction.

As regards the third summary of
Special Reporter, Mr. JOURDAIN reques
that an official text of this kind sho
not minimise the value of the techni
and economic efficiency of the railwa
as in spite of all that has been said, a
the burden it has to shoulder, transp
by rail is still the cheapest method,
was brought out by previous Congres

Dr. TRIERENBERG (*Reporter*) thought at the French experience mentioned by r. JOURDAIN appeared very interesting. e was of the opinion that the difficulty the matter of co-ordination was that ilways were used solely for public traf- c, whereas road motor transport was in e hand of private undertakings. It was sential that the legislation of the va- ous countries should not in any way nder economic development. The traf- c policy of the countries should conse- ently aim at protecting and developing hat is economically sound. For goods affic it was necessary to consider not ly the agents but also the hauliers. th forms of undertaking were in pri- te hands. One had to take care, there- re, to combine the private economic terests of isolated carriers with the blic interests. In this case private dertakings must, naturally, be able to velop in a sound manner. This could t be accomplished unless private risks ld in some measure be borne by the nmunity.

To that end, the intervention of the te is sometimes inevitable. The pu- c ought, in the interests of private dertakings, which are necessary from economic point of view, to bear some rifices.

Ir. LEVEL (*Voies ferrées d'intérêt l, France*) asked that mention be de of the secondary lines, which are ked at a loss by the large Systems, l could be handed over to local compa- s.

— After an exchange of views about opportunity there was to seriate the stions — general discussion and sum- ries — an endeavour was made to e the general discussion.

Ir. JARRIGION (*Ministry of Public Works, France*) wished to bring out that the railways were burdened with heavy obligations from which other carriers were exempt, and asked that this state of affairs be mentioned in the summaries.

The speaker proposed that the words « also the application to road transport of the laws and social obligations imposed on the railways » be added to Summary 6. He also insisted on the observance by road carriers of police regulations on motor transport.

Mr. DE SOUSA (*State Railways in the Portuguese Colonies*) said he was pleased to see that the Special Reporter had not omitted to stress an important principle. The railway was not an industrial undertaking whose financial balance sheet must necessarily be kept in equilibrium. It was an instrument of national life; its function was not prejudiced by its financial balance. It was a public service.

Dr. COTTIER thanked Mr. JOURDAIN for having explained the evolution of the present French regulations. In Switzerland, the policy of co-ordination proposed in 1933 collapsed before the electors in 1933. In Germany, it failed in some respects because of the impossibility of practical application of some controls. It seemed that the future lay in the control of the revenue of the carriers. This German opinion had taken foot in Switzerland. This was bound up with the question of a guarantee fund, the principle of which it would have been interesting to see discussed in detail.

The general discussion came to an end, and Dr. COTTIER was appointed by the PRESIDENT to form and preside over the Committee set up to prepare the summaries to be presented to the Meeting of the Section on June 3rd.

Meeting held on June 3rd, 1937.

— The Section met in order to examine the summaries drawn up by the special Committee.

The President stated that, owing to lack of time, it had not been found possible to arrive at definite summaries, and he proposed to read out the provisional wording, so as to enable the Members to voice their opinion, which would be taken into account when drawing up the new text.

Dr. Cottier stated that the Special Committee — made up of the five Reporters; with whom Messrs. Le Besnerais (*French Nord Railway*), Jourdain, Wattier and Metternich (both of the *Permanent Committee on Rail Transport, League of Nations)* were good enough to join — made an endeavour to define such alterations to the wording as would take into account the opinions expressed, but that it had not been possible to complete this task.

Certain Delegates having questioned the usefullness of a discussion under these conditions, the Meeting nonetheless decided to hear Dr. Cottier who wished to outline the work done by the Special Committee and the general import of the alterations made by the Members who participated in this task. Mr. Ashton Davies (*Reporter*), for instance had voiced the opinion that stress should be laid on the facts that the railway was essentially a public service, and that road competition was particularly harmful. Mr. Wattier had expounded the question of the part which should be assigned to road transport and that of the means of co-ordination. He had also indicated the obligations which should fall on road carriers. Mr. Le Besnerais had shown the necessity of intensifi advertizing on behalf of the railway.

After this statement Mr. Level recall the opinion expressed at the Cairo Co gress that no worthy result could be c tained without the licence system.

Dr. Cottier, supported by Mr. Melli stated that the licence system is insuf cient by itself and that concentration transport should be considered.

After this exchange of views, it w decided that the Special Committee wou prepare final summaries which would discussed on June 8th.

Meeting held on June 8th, 1937.

The Meeting opened at 9.45 under presidency of Dr. Wasiutynski.

Mr. Mellini, who replaced Dr. Cott as *Special Reporter*, recalled under w circumstances was set up the Spe Committee entrusted with the task drafting the proposed summaries. A p liminary statement in connection w this work had been made by Dr. Cott in the course of the Meeting held June 3rd. As the outcome of subsequ meetings, the Special Committee was n able to submit the proposed summar

Mr. Mellini gave the general lines which these summaries had been dr up. They essentially dealt with th fundamental questions — the world sis, road competition, and hindrance international trade. The first and th questions were dealt with in Summar The remainder of the summaries ref ed to competition.

The importance of competition brought out in Summary 2, as well as necessity there was to assign to the r motor vehicle an appropriate part to play. The subsequent summaries recalled the nature of public services assumed by the railways and the special obligations resulting therefrom. An endeavour was made in these summaries to define the limits of the field of activity of both methods of transport, and to lay down in what direction the intervention of the Public Authorities should show itself. This was made the subject of Summaries 3, 4 and 5. Summaries 6, 7, 8 and 9 dealt with the possibilities there are to improve the railway position, especially that of the secondary railways.

Mr. Jouaville (*Algerian Railways*) explained how, in Algeria, transport coordination which is an accomplished fact since the middle of the year 1936 in the case of passenger traffic, is about to be achieved with regard to goods traffic.

The President then opened the discussion of the summaries.

Summary 1 :

1. Under the influence of trade recovery throughout the world, rail-borne raffics show a certain increase which, owever, falls short of the general increase in production.

One of the primary causes why the nancial situation of railways is slow in improving in most countries is the act that exchange of goods between difrent countries is handicapped by imort restrictions, systems of « clearing », ontrol of currency, and monetary instality.

It is therefore desirable, in the interests of the financial equilibrium of ransport undertakings, that artificial arriers limiting international commerce hould be lowered, and in so far as posible suppressed.

Mr. de Souza proposed a slight alteration mentioning that traffic does not revive on all railways.

— Adopted with this modification.

Summary 2 :

2. But the most important cause of the delay shown in the improvement of the financial situation of railways lies in the continual development of road transport competition.

In fact, in every country, the number of motor vehicles and their loading capacity are increasing, at the same time as roads are being extended and improved. The consequence is that competition from road vehicles becomes more and more acute, and the harmful results of this are reflected in the general position of railways.

Although road transport must have a place in the field of transport, the question of its rightful place in that field cannot yet be said to have been answered with any degree of finality.

— Adopted with a slight alteration to the French text. The English wording remains unaltered.

Summary 3 :

3. Railways are under legal obligation to ensure public transport in accordance with principles dictated by national economic interests. The consequence to Railways is that they have special responsibilities not incumbent on other methods of transport which, not being bound by the same obligations to public interests, are free to pick and choose their traffics, and fix their tariffs.

Under rational organization, road transport should be complementary to rather than competitive with rail transport. It should, therefore, only be encouraged to the extent to which it is essential and affords a type of service not possible by rail. It is desirable, in particular, that special care should be taken to conserve long-distance and heavy traffics to the Railways, whose economic status should, in the general interests, be preserved.

Mr. DE SOUZA proposed to substitute in the first paragraph « ...general public interests » for « ...national economic interests ».

— Adopted with this amendment.

Summary 4 :

4. It is desirable that the closest possible co-ordination should be brought about between Railways and road motor vehicles offering a service to the public, notably by the following means :

(*a*) by participation of Railways in road transport, a participation which may, in certain cases, extend as far as concentration under one management;

(*b*) by an allocation of traffics between the two methods of transport, either by mutual agreement sanctioned by the Authorities, or by direct orders from the Authorities;

(*c*) by substituting for competitive road services combined road-rail services such as containers, transport by rail of loaded lorries or trailers, etc.

In order that efforts to coordinate public transport may not be nullified, it is also necessary that appropriate measures be taken to regulate private transport of goods by road motor, particularly over long distances.

The application of these various measures presupposes the existence of sufficient motor traffic statistics, such as are already drawn up in some countries.

As suggested by Mr. ASHTON DAVIES, the last paragraph was amended in order to bring out better the need for statistics in all countries.

Summary 5 :

5. With the object of avoiding unfai competition, and to give to the patron of road hauliers the necessary securit (as also to other road users), the appro priate authorities should :

(*a*) keep under strict observation a road vehicles and see that the transpor bye-laws are carried out, through th intermediary of the police, with th main object of securing greater safety o the road;

(b) insist on all public road carrie carrying out their responsibilities tow ards their clients, covering themselve against third-party risks in the sam way the railways are obliged to do;

(c) adopt conditions of service in re pect of staff employed in the publ transport of both passengers and good comparable with those in force on th railways of the country.

— A proposal by Mr. JOUAVILLE tendin to say that « the competent authoriti should see to it that the established c ordination regulations be observed » w defeated.

Mr. JARRIGION proposed that mentio be made, in paragraph *(c)*, not only labour regulations but also of social legi lation. After a discussion it was decid to take this remark into account saying : « ensure in respect of staff e ployed... working conditions compara with those in force on the railways of t country ».

Summary 6 :

6. In order to suit all economic nee it is important that all methods of pub transport adopt published tariffs, cons tently applied, and based as far as p sible on the same principles. If, in oth respects, conditions of equality could achieved between rail and road tra

port, the carrying out of such a measure would avoid the unnecessary reduction of their existing rates by both parties.

Until such time as this question, the application of which would be rather difficult, has been solved, the railways of most countries are still compelled to resort to the lowering of rates.

The reduction of rates in specific cases, sometimes granted only on condition that the firms concerned hand over the whole of their transport to the railway, has been found to give better results than general rates reduction.

After an exchange of views it is decided to state at the beginning of the last paragraph : « Until such as time the difficulties inherent in this question have been solved... », the purpose of the alteration being to show that the difficulties can be solved.

Summary 7 :

7. On those services were working is to be continued by the railway, the improvement of passenger facilities, by increasing the speed and frequency of trains, as well as improvements in their comfort, have proved to be efficacious means of meeting competition, and it is desirable to continue in this direction.

On the goods side, experience has shown that regularity in delivery times, acceleration of transport, and extension of door-to-door facilities, are excellent means of increasing traffic.

Mr. MATTER proposed an amendment to the second paragraph, tending to bring out the importance of door-to-door service extended to a certain distance, so as to reach regions having no railway.

His proposal is adopted, the final wording being, however, that suggested by Mr. LE BESNERAIS : « *and should be adopted wherever possible.* »

Summary 8 :

8. The experience gained by the different Railway Administrations has shown the benefits obtained from suitable advertising and general propaganda. It is most desirable that all forms of advertising and propaganda be developed, that canvassing for traffic be intensified, that closer contact with clients be obtained in order better to understand their wishes and needs, and keep them informed as to the various possibilities and advantages to be derived from the use of the railway.

— Adopted without alteration.

Summary 9 :

9. Speaking more generally, Railways must continue to follow the commercial methods which have been proved sound in other spheres of business.

It is also particularly desirable that Railways introduce methods designed to encourage the interest of employees in the development of traffic and the economic position of the railway service.

The first paragraph was completed at the suggestion of Mr. LAMARQUE (*French Nord Railway*), by adding to the first sentence : « *especially since they now no longer enjoy a virtual monopoly of transport* », and by adding, moreover, a second sentence asking the Public Authorities to afford the railways the means to facilitate their management on a commercial basis.

The summaries of Question X were consequently adopted as worded hereafter :

Summaries.

« 1. Under the influence of trade re-
« covery throughout the world, rail-borne

traffics generally show a certain increase which, however, falls short of the general increase in production.

« One of the primary causes why the financial situation of railways is slow in improving in most countries is the fact that exchange of goods between different countries is handicapped by import restrictions, systems of « clearing, control of currency, and monetary instability.

« It is therefore desirable, in the interests of the financial equilibrium of transport undertakings, that artificial barriers limiting international commerce should be lowered, and in so far as possible, suppressed.

« 2. But the most important cause of the delay shown in the improvement of the financial situation of Railways lies in the continual development of road transport competition.

« In fact, in every country, the number of motor vehicles and their loading capacity are increasing, at the same time as roads are being extended and improved. The consequence is that competition from road vehicles becomes more and more acute, and the harmful results of this are reflected in the general position of Railways.

« Although road transport must have a place in the field of transport, the question of its rightful place in that field cannot yet be said to have been answered with any degree of finality.

« 3. Railways are under legal obligation to ensure public transport in accordance with principles dictated by general public interests. The consequence to Railways is that they have special responsibilities not incumbent on other methods of transport whic not being bound by the same oblig tions to public interest, are free pick and choose their traffics, and f their tariffs.

« Under rational organization, ro transport should be complementary rather than competitive with, r transport. It should, therefore, or be encouraged to the extent to whi it is essential and affords a type service not possible by rail. It is sirable, in particular, that special c should be taken to conserve lo distance and heavy traffics to the R ways, whose economic status should, the general interests, be preserved.

« 4. It is desirable that the closest p sible co-ordination should be brou about between Railways and road m tor vehicles offering a service to public, notably by the following mea

« (*a*) By participation of Railways road transport, a participation wh may, in certain cases, extend as as concentration under one man ment;

« (*b*) By an allocation of traffics ween the two methods of transp either by mutual agreement s tioned by the Authorities, or by d orders from the Authorities.

« (*c*) By substituting, for compet road services, combined road-rail vices such as containers, transpor rail of loaded lorries or trailers, e

« In order that efforts to coord public transport may not be nulli it is also necessary that approp measures be taken to regulate pr transport of goods by road motor, ticularly over long distances.

« The application of these various measures would require the existence of sufficient motor traffic statistics, such as are already drawn up in some countries.

« 5. With the object of avoiding unfair competition, and to give to the patrons of road hauliers the necessary security (as also to other road users), the appropriate Authorities should :

« (*a*) Keep under strict observation all road vehicles and see that the transport bye-laws are carried out, through the intermediary of the police, with the main object of securing greater safety on the road;

« *(b)* Insist on all public road carriers carrying out their responsibilities towards their clients, covering themselves against third-party risks in the same way the railways are obliged to do;

« *(c)* Ensure in respect of staff employed in the public transport of both passengers and goods, working conditions comparable with those in force on the railways of the country.

« 6. In order to suit all economic needs, it is important that all methods of public transport adopt published tariffs, consistently applied, and based as far as possible on the same principles. If, in other respects, conditions of equality could be achieved between rail and road transport, the carrying out of such a measure would avoid the unnecessary reduction of their existing rates by both parties.

« Until such time as this rather difficult question has been solved, the Railways of most countries are compelled to resort to the lowering of rates.

« The reduction of rates in specific cases, sometimes granted only on condition that the firms concerned hand over the whole of their transport to the Railway, has been found to give better results than general rates reduction.

« 7. On those services where working is to be continued by the railway, the improvement of passenger facilities, by increasing the speed and frequency of trains, as well as improvements in their comfort, have proved to be efficacious means of meeting competition, and it is desirable to continue in this direction.

« On the goods side, experience has shown that regularity in delivery times, acceleration of transport, and extension of door-to-door facilities, are excellent means of increasing traffic, and should be adopted wherever possible.

« 8. The experience gained by the different Railway Administrations has shown the benefits obtained from suitable advertising and general propaganda. It is most desirable that all forms of advertising and propaganda be developed, that canvassing for traffic be intensified, that closer contact with clients be obtained in order better to understand their wishes and needs, and keep them informed as to the various possibilities and advantages to be derived from the use of the railway.

« 9. Speaking more generally, Railways must continue to follow the commercial methods which have been proved sound in other spheres of bussiness, especially since they now no longer enjoy a virtual monopoly of transport.

« Wherever necessary, it is desirable that Government Authorities should afford the Railways the necessary facilities to carry out a policy of a commercial character.

« It is also particularly desirable that « Railways introduce methods designed « to encourage the interest of employees « in the development of traffic and the « economic position of the railway service. »

— The Plenary Meeting held on June 11th ratified these summaries.

QUESTION XI.

Selection, orientation and instruction of railway staff.

Preliminary documents.

Report (Italy, Spain, Portugal and Colonies, Great Britain, Dominions and Colonies, America, China, Japan, Egypt), by Pietro Lo Balbo. (See *Bulletin*, October 1936, p. 1027, or separate issue No. 3.)

Report (Poland, Germany, Netherlands and Colonies, Denmark, Norway, Sweden, Finland), by J. Wojciechowski. (See *Bulletin*, November 1936, p. 1113, or separate issue No. 4.)

Report (Czechoslovakia, France and Colonies, Belgium and Colony, Luxemburg, Switzerland, Austria, Hungary, Jugoslavia, Bulgaria, Rumania, Greece, Turkey), by J. Hondl. (See *Bulletin*, May 1937, p. 1191, or separate issue No. 31.)

Special Reporter : J. Wojciechowski. (See *Bulletin*, June 1937, p. 1588.)

Report of Section IV.

(See *Daily Journal of the Session*, No. 4, pp. 6 and 7; No. 5, p. 2.)

Meeting held on June 4th, 1937.

The *Special Reporter*, Mr. Wojciechowski, being unable to attend the Congress, owing to illness, the special report o Question XI was brought up by Mr. Targonski, Head of the Psychotechnical R search Office, Polish State Railways.

Mr. Targonski briefly outlined th question and read the proposed sum maries which, in his opinion, could b drawn from the reports. (*These sum maries differ from those originally draw up by* Mr. Wojciechowski, *and publish in the June 1937* Bulletin, *p. 1594. Th are given hereafter in succession, as th were examined by the Meeting.*)

Mr. Hondl (*Reporter*) said that, unli what was stated in his report, psych technical selection was only resorted in Rumania since 1936. He made so remarks in connection with the utili of psychotechnics and stated that would be desirable to establish the D partment dealing with Accidents, on scientific basis.

Mr. Jarrigion (*Ministry of Pub Works, France*) thought it would be w to bring out the human and social natu of psychotechnics, in order to avoid th the staff only consider the examinatio as a mere means of elimination.

— The general discussion being clos the President proposed to proceed w the examination of the summaries dra up by Mr. Targonski, remarking at same time that they had been well riated, according to the three points m king up the question : I. *Selection;* *Orientation;* and III. *Instruction* of staff.

The President then read *point I* d ing with the selection of the staff.

I. As regards the selection of staff, reporters found that :

1. Psychotechnics are being app

:adually by many (18) Railway Admi-
istrations who consider this method as
1 indispensable factor of a rational se-
ction of their staff.

— Adopted without modification.

The PRESIDENT read *Clause 2* :

2. Psychotechnics tend to increase
ie staff's output and to reduce the num-
er of accidents due to the human ele-
ent.

Mr. LÉYV (*French State Railways*) pro-
osed to add after « ...the staff's out-
ıt » « and the quality of the word
me... ».

— After an exchange of views between
e PRESIDENT, Messrs. LÉVY and PANAI-
POL (*Rumanian State Railways*), it is
cided to state : « ...the quality and
ıantity of the staff's output... »

The PRESIDENT read *Clause 3 :*

3. The coefficient of concordance of
e professional value of railway staff
actual service as compared with the
sults of the psychotechnical examin-
ons, is between 70 and 90 %.

— Adopted without alteration.

The PRESIDENT passed on to *points 4*
l 5.

. Psychotechnical methods applied
the professional training of staff pro-
se to make it more rapid, efficient
l less costly.

. The psychotechnical methods adopt-
by the different Administrations are
uniform; some tests are used which
fer more or less in kind and number.

— Adopted.

he PRESIDENT calls the attention of
Meeting to the fact that the above points are findings from which the Special Reporter drew the summaries given hereafter :

In view of the results of the examination of the question, it was thought advisable to recommend to all the Railway Administrations :

1. To introduce psychotechnical methods for the selection of their employees in order to contribute to the development of this new science.

Mr. PANAITOPOL suggested a modified form, as follows : « 1. To introduce psychotechnical methods for the selection of their employees *and to contribute* to the development of this new science ».

Mr. MAYER (*Nord-Belge Lines*) proposed to substitute the term « methods » for « science », seeing that psychotechnics cannot, in their present state of development, be considered as a science.

— This summary is adopted with the suggested alterations.

The PRESIDENT reads *Summary 2 :*

2. To standardize methods of psychotechnical tests by favouring the exchange of views and experience.

Mr. GOURSAT (*French Nord Railway*), while agreeing as to the substance of this wish, is of the opinion that standardization of psychotechnical methods should be restricted to certain functions which are identical on all Railways : signalmen, locomotive drivers, railcar drivers...

— As the result of an exchange of views between the PRESIDENT, Messrs. GOURSAT, LO BALBO, LÉVY, PERDIEUS (*Belgian National Light Railways Co.*) and PANAITOPOL, the summary is altered as shown hereafter, and a third clause is added, relating to periodical examinations :

« 2. To standardize methods of psychotechnical tests applied to candidates to the railway service, especially to certain functions dealing with working safety (signalmen and pointsmen, engine drivers and drivers of railcars) and to favour in the best possible manner the exchange of views and experience acquired in this connection. »

« 3. To take into consideration the usefulness of periodical examinations for certain functions in connection with the safety of the working. »

The PRESIDENT passed on to point 3, which thus became point 4 :

3. To introduce into their statistics of accidents a more precise qualification of their causes due to the human element, conjointly with the result of the psychotechnical examinations.

Mr. PANAITOPOL proposed to say « of causes due... » instead of « of their causes due... ».

— This clause was adopted with this alteration.

The PRESIDENT reads Chapter II of the summaries, in connection with the *professional guidance* of the staff.

II. The professional guidance of staff is not applied according to the results of the psychotechnical examinations, owing to the fact that these examinations are exclusively applied to candidates for given duties.

— After an exchange of views between Messrs. PANAITOPOL, LO BALBO and FILIPPINI, the Meeting decided to add to this text a wish tending to replace the question of professional guidance of the
on the Agenda of the XIVth Sessio

The PRESIDENT then read Chapte
of the summaries, relating to *profess*
training :

III. Methodical education of candi
for the various departments as well
improvement of staff already in se
usually take the form of schools an
cial lectures.

It must be recognized that such
ation is given in rather various wa

The introduction of psychotec
during the course of such instru
takes place only on the German
Railways, and it seems advisable f
the other Railway Administratio
adopt the same methods.

Mr. GIOVENE (*Italian State Rail*
suggests the following addition :

« The Meeting expresses the
that, together with the transformat
installations and ways and means o
ration, already in progress, the v
Administrations consider the neces
adapting to the new state of affai
education of staff already in servi
means of specially organised tr
courses. »

The Meeting approves this additi
the PRESIDENT closes the Meeti
12.30 p. m.

— The Plenary Meeting held o
7th ratified these summaries. H
on the suggestion of Mr. HENRY-
(*Permanent Commission of the A*
tion and *Paris-Orléans Railway*
text of Summary 4, chapter II, her

« 4. To introduce into their st
of accidents a more precise qu
tion of causes due to the hum
ment, conjointly with the result
psychotechnical examinations »,

was replaced by the following wording :

« 4. To introduce into their statistics of accidents a more precise qualification of causes due to the human element, conjointly with the result of the psychotechnical examinations of the members of the personnel involved in these accidents. »

— The final summaries thus run as follows :

Summaries.

« I. As regards the selection of staff, « the reporters found that :

« 1. Psychotechnics are being applied « gradually by many (18) Railway Ad- « ministrations who consider this me- « thod as an indispensable factor of a « rational selection of their staff.

« 2. Psychotechnics tend to increase « the quality and quantity of the staff's « output and to reduce the number of « accidents due to the human element.

« 3. The coefficient of concordance of « the professional value of railway staff « in actual service as compared with the « results of the psychotechnical exami- « nations, is between 70 and 90 %.

« 4. Psychotechnical methods applied « to the professional training of staff « promise to make it more rapid, effi- « cient and less costly.

« 5. The psychotechnical methods « adopted by the different Administra- « tions are not uniform; some tests are « used which differ more or less in kind « and number.

« In view of the results of the exami- « nation of the question, it is thought « advisable to recommend to all the Rail- « way Administrations :

« 1. To introduce psychotechnical me- « thods for the selection of their em- « ployees and to contribute to the deve- « lopment of these methods.

« 2. To standardize methods of psy- « chotechnical tests applied to candida- « tes to the railway service, especially to « certain functions dealing with working « safety (signalmen and pointsmen, en- « gine drivers and drivers of railcars) « and to favour in the best possible « manner the exchange of views and ex- « perience acquired in this connection.

« 3. To take into consideration the « usefulness of periodical examinations « for certain functions in connection « with the safety of the working.

« 4. To introduce into their statistics « of accidents a more precise qualifica- « tion of causes due to the human ele- « ment, conjointly with the result of the « psychotechnical examinations of the « members of the personnel involved in « these accidents.

« II. The professional guidance of « staff is not applied according to the « results of the psychotechnical exami- « nations owing to the fact that these « examinations are exclusively applied « to candidates for given duties.

« Seeing that the professional gui- « dance of the staff according to psy- « chotechnical methods seems to be of « special interest, the Meeting proposes « that this matter be placed on the agen- « da of the 14th Session of the Interna- « tional Railway Congress Association.

« III. Methodical education of candi- « dates for the various departments as « well as the improvement of staff al-

« ready in service usually take the form
« of schools and special lectures.

« Il must be recognized that such education
« is given in rather various ways.

« The introduction of psychotechnics
« during the course of such instruction
« takes place only on the German State
« Railways, and it seems advisable for
« all the other Railway Administrations
« to adopt the same methods.

« The Meeting expresses the desire
« that, together with the transformation
« of installations and ways and means
« of operation, already in progress, the
« various Administrations consider the
« necessity of adapting to the new state
« of affairs the education of staff already
« in service, by means of specially
« organised training courses. »

5th SECTION. — Light railways and Colonial railways.

President : E. Mellini.
Vice-Presidents : Th. H. Watermeyer, Lt.-Col. R. E. Gordon, Dr. C. C. Wang,
and Dr. O. de Senn.
Principal Secretary : A. Allard.

QUESTION XII.

Co-ordination of operation as between main-line and light railways.

Preliminary documents.

Report (All countries), by Messrs. Bel- nte and Tosti (See *Bulletin*, May 1937, 1225, or separate issue No. 33.)

Special Reporter : Mr. Belmonte. (See *ulletin*, June 1937, p. 1595.)

eport of Sections III and V combined.

(See *Daily Journal of the Session*, . 6, pp. 6 and 7, and No. 9, p. 1.)

Meeting held on June 8th, 1937.

The Meeting was opened at 9.30 a. m., der the presidency of Mr. Mellini.

Being called as a Reporter in another ction, the President requested Mr. Pel- rin, President of the 3rd Section, to e his place.

Mr. Pellarin called upon Mr. Bel- nte, the *Special Reporter*.

Mr. Belmonte recalled the main points his report; the latter consisted of ee parts, relating to installations and nnections, to conditions of operation mmon and separate stations, combined d connecting services, rating and rou- g of transport, use of rolling stock and containers), and to accessory operating services.

— The Meeting then examined the summaries proposed by the *Special Reporter*.

Summaries 1 to 3 :

1. In all countries, co-ordination of operation of the main-line and secondary railways is recognised, in principle, as not only useful, but necessary in the general interest.

2. It is generally considered as an effective means of meeting the growing competition of other more modern methods of transport.

With particular regard to the *installations :*

3. In the case of two railways of the same gauge, it is preferable to have common junction stations in which the existing equipment of the main-line railway is used to cover the needs of the secondary railway.

— These summaries were adopted without discussion.

Summary 4 :

4. In the case of railways of different gauges, with separate stations near one another, the narrow-gauge line should run into the main-line railway station, unless transporter trucks are used; in this case it is desirable that the connection should be a standard-gauge line.

The President thought is useful to explain that transporter trucks always ran on narrow-gauge track.

— Summary 4 was adopted.

Summaries 5, 6 and 7 :

As regards *operation :*

5. Both in joint stations and in separate stations connected together, the main-line railway should co-operate to the maximum possible extent, in return for suitable compensation.

6. Through (interchange) traffic should be dealt with under a combined-service system, with a single transport contract (waybill) and joint responsibility of the carriers.

7. When a combined service is impossible or inconvenient, the carriers should make agreements about correspondence services for carrying goods without intervention of the parties concerned at the junctions, fixing according to the best interests of the users the limits of responsibility and competency of each carrier, administratively and legally.

— Adopted without alteration.

Summary 8 :

8. It is desirable that the carriers should control their own rates and on the basis of these rates, each carrier should receive the amount due for the services actually carried out on his line.

Replying to the President, Mr. Belmonte indicated that there were two possible solutions : simply adding together the charges resulting from the tariffs of the two Systems, or applying a single charge for the whole of the two Systems.

Mr. Latrasse (*French Nord Railway*) remarked that the word « remuneration » would be more exact than « amount ».

— Summary 8 was adopted with thi
modification.

Summary 9 :

9. It is always better for throug
transport to follow the cheapest rout
unless this seriously interferes wit
prompt delivery.

— Adopted without discussion.

Summary 10 :

10. It is not desirable, in principle,
enforce transit in the case of throug
traffic, even when the transit route
the shortest.

Mr. Belmonte stated that he on
wished to record a principle to whic
exceptions could always be made
agreement between Railway Systems.

— Clause 10 was adopted as it stoo

Summary 11 :

11. When common stock and the ind
criminate use of goods wagons are
considered advantageous, railways of t
same gauge, provided safety is not affe
ed, should make agreements for the
ciprocal exchange of goods wagons,
at least for running main-line vehic
over the secondary railway.

— Adopted.

Summary 12 :

12. In the case of narrow-gauge r
ways, carriage on transporter trucks
in containers may very effectively pr
an adequate corrective of the differe
in gauge.

Mr. Lambe asked for an explanat
about transporter trucks.

Messrs. Latrasse, Delille (*Reporte*
Matter (*Swiss Federal Railways*)

Belmonte gave particulars of the results obtained on their respective Systems. These results were generally satisfactory for complete loads.

On the French Nord Railway owing to local circumstances (closing down of a factory) the expected results were not obtained. This System was ready, nevertheless, to proceed with fresh trials, if occasion arose.

— Summary 12 was adopted as it stood.

Summary 13 :

13. In the case of passenger services, connecting the light railway with important centres on the main-line railway by means of trains continuing over sections of the main-line can be tried with profit.

Mr. Belmonte mentioned the case of complete trains running through from a light railway on to a main line, which had given complete satisfaction to the public.

— Summary 13 was adopted.

Summaries 14, 15 and 16 :

As regards *competition,* conjointly with the more important means investigated by the technical services to get the best out of co-ordination, the following can be recommended :

14. The main-line railway should co-operate to the maximum extent in increasing the average speed of goods in through traffic.

15. The greatest possible extension should be given, by both the main-line and secondary railways, to accessory services making possible door-to-door transport, using if need be containers and road vehicles.

16. Whilst safeguarding the autonomous organisation of each railway, the accountancy work should be simplified as far as possible and the particular branches of the services should be combined in order to eliminate duplication.

As suggested by the President, these three clauses were made into a single summary.

Mr. Matter stated that in Switzerland, « door to door » transport existed at all stations of both main and secondary lines. Connecting services over long distances, to districts where no railway existed, had also been organised.

These services were entrusted to contractors, private persons and even sometimes to the personnel of small stations. The postal motor services, which run daily whereas private services only run two or three times a week, are also made use of.

Mr. Matter wished the text to be amended in this sense.

Mr. Belmonte, while admiring the perfect Swiss organisation, thought it was going too far to recommend the obligation to give « door to door » service at all stations. Switzerland was a relatively small country, where the organisation or road services was very well developed, even before the construction of railways. These specially favourable circumstances do not occur generally in very large countries.

Messrs. Latrasse, Delille and the President agreed.

Summary 14 (former 14, 15 and 16) was adopted, with a modification to the former clause 15, to which Mr. Matter agreed.

— In closing the Meeting, the PRESIDENT complimented Mr. BELMONTE on the excellent wording of the summaries which had obtained, almost without discussion, the concurrence of all Members.

The summaries adopted by Sections III and V, meeting jointly, run as follows :

Summaries.

« 1. In all countries, co-ordination of « operation of the main-line and secon« dary railways is recognised, in prin« ciple, as not only useful, but necessary « in the general interest.

« 2. It is generally considered as an « effective means of meeting the grow« ing competition of other more modern « methods of transport.

« With particular regard to the *instal« lations :*

« 3. In the case of two railways of the « same gauge, it is preferable to have « common junction stations in which « the existing equipment of the main« line railway is used to cover the needs « of the secondary railway.

« 4. In the case of railways of diffe« rent gauges, with separate stations near « one another, the narrow-gauge line « should run into the main-line rail« way station, unless transporter trucks « are used; in this case it is desirable « that the connection should be a stan« dard-gauge line.

« As regards *operation :*

« 5. Both in joint stations and in se« parate stations connected together, the « main-line railway should co-operate « with the light railway to the maximum « possible extent, in return for suitable « compensation.

« 6. Through (interchange) traffi
« should be dealt with under a combined
« service system, with a single transpor
« contract (waybill) and joint responsi
« bility of the carriers.

« 7. When a combined service is im
« possible or inconvenient, the carrier
« should make agreements about corre
« pondence services for carrying good
« without intervention of the partie
« concerned at the junctions, fixing ac
« cording to the best interest of the user
« the limits of responsibility and com
« petency of each carrier, administrativ
« ly and legally.

« 8. It is desirable that the carrier
« should control their own rates, an
« on the basis of these rates each carrie
« should receive the remuneration du
« for the services actually carried ou
« on his line.

« 9. It is always better for throug
« transport to follow the cheapest rou
« unless this seriously interferes wi
« prompt delivery.

« 10. It is not desirable, in principl
« to enforce transit in the case
« through traffic, even when the trans
« route is the shortest.

« 11. When common stock and th
« indiscriminate use of goods wago
« are not considered advantageous, ra
« ways of the same gauge, provided s
« fety is not affected, should make agre
« ments for the reciprocal exchange
« goods wagons, or at least for runni
« main-line vehicles over the seconda
« railway.

« 12. In the case of narrow-gauge ra
« ways, carriage on transporter truc
« or in containers may very effective
« prove an adequate corrective of t
« difference in gauge.

« 13. In the case of passenger services, connecting the light railway with important centres on the main-line railway, by means of trains continuing over sections of the main-line, can be tried with profit.

« 14. As regards *competition*, conjointly with the more important means investigated by the technical services to get the best out of co-ordination, the following can be recommended :

« (*a*) The main-line railway should co-operate to the maximum extent in increasing the average speed of goods in through traffic;

« (*b*) The greatest possible extension of « door to door » transport, even at all stations of both the main-line and secondary railways, and, where required, the organisation of road transport in districts not served by rail;

« (*c*) Whilst safeguarding the autonomous organisation of each railway, the accountancy work should be simplified as far as possible and the particular branches of the services should be combined in order to eliminate duplication. »

— The Plenary Meeting held on June 1th ratified these summaries.

QUESTION XIII.

pecifications for the fixed plant of railways with light traffic, intended to prevent the use of unnecessarily expensive track equipment, and generally to give economical working.

Preliminary documents.

Report (Great Britain, Dominions and olonies, America, China, Japan), by r. Van Noorbeeck. (See *Bulletin*, November 1936, p. 759, or separate issue No. 7.)

Report (Countries of Continental Europe and their Colonies, Egypt), by A. Svoboda. (See *Bulletin*, March 1937, p. 1235, or separate issue No. 23.)

Special Reporter : A. Svoboda. (See *Bulletin*, June 1937, p. 1601.)

Report of Section V.

(See *Daily Journal of the Session*, No. 8, pp. 4 and 5; No. 9, p. 1.)

Meeting held on June 10th, 1937.

The President called upon Mr. Svoboda (*Special Reporter*), who briefly outlined the various problems raised in his special report and the proposed summaries.

He endeavoured to define what, in his opinion, should be called « Railways with light traffic ».

Three points should be specially borne in mind :

(1) initial cost of the line;
(2) maintenance;
(3) operation.

Mr. Svoboda then expounded the gauge question. It appears advisable to build new lines to the same gauge as that of the lines with which they will have to be connected.

When deciding the general layout and gradient section, the resulting maintenance costs and operating expenses should be kept in sight.

Mr. Svoboda then dwelled on the type of track (heavy or light) to be selected, this question being closely connected with the present tendency towards higher running speeds.

In his opinion, the working methods ought to be perfected in order to reduce the operating expenses.

In the course of his statement, he incidentally dealt with the question of modern safety installations at level crossings.

A general discussion ensued in which Messrs. LEVEL (*Compagnie générale des Voies ferrées d'intérêt local, France*), JOURDAIN (*Chemins de fer du Nord-Est, France*), the PRESIDENT and Mr. SVOBODA took part, and it was decided to limit the question to the fixed permanent-way installations.

— The PRESIDENT then suspended the Meeting in order to enable a Special Committee to draw up abridged summaries.

— When the Meeting was reopened, the PRESIDENT read the new summaries in succession.

Summary 1 :

1. In most countries the general tendency is no longer to construct railways for light traffic.

— Adopted without discussion.

Summary 2 :

2. Whenever special circumstances, however, necessitate the construction of such railways, it is recommended to build them to the same gauge as those lines to wich they are to be joined, or to the same gauge as that of the railway which they are to complete and to adopt conditions of lay-out and gradient section which would allow of the reduction of traction costs.

— Adopted.

Summary 3 :

3. As far as the railways at presen in operation are concerned, it is nece sary :

(*a*) To concentrate as much as po sible the fixed installations of the statior (buildings, points and crossings) accor ing to the requirements of the traffic, i order to reduce to a strict minimum th maintenance costs, train manœuvrir times and the necessary staff for tl operation of these stations.

(*b*) To take full advantage of exp rience and technical progress as far as compatible with the operation of suc lines, in order to reduce as much possible the necessity for specialis staff.

(*c*) To profit from the reneval of inst lations subject to wear and tear by t employment of more appropriate inst lations, brought about by acquired e perience, and modern processes (use heavier rails, welding of rails, transiti curves, etc.) or to complete the equi ment of the lines by certain installatio which, in accordance with the progr of technical science, also offer better co ditions to reach the proposed end.

Mr. JOURDAIN proposed to replace, paragraph (*a*), « according to the req rements of the traffic » by « taking i account the requirements of the traffic and also to replace in the same pa graph, the words « for the operation these stations » by « for the operation the stations ».

— Summary 3 was adopted with th alterations.

The final summaries consequently as follows :

Summaries.

« 1. In most countries the general t

« dency is no longer to construct rail- « ways for light traffic.

« 2. Whenever special circumstances, « however, necessitate the construction « of such railways, it is recommended to « build them to the same gauge as those « lines to which they are to be joined, « or to the same gauge as that of the « railway which they are to complete, « and to adopt conditions of lay-out and « gradient section which would allow of « the reduction of traction costs.

« 3. As far as the railways at present « in operation are concerned, it is ne- « cessary :

« (*a*) To concentrate as much as pos- « sible the fixed installations of the sta- « tions (buildings, points and crossings) « taking into account the requirements « of the traffic, in order to reduce to « a strict minimum the maintenance « costs, train manœuvring times and the « necessary staff for the operation of « the stations.

« (*b*) To take full advantage of ex- « perience and technical progress as far « as is compatible with the operation of « such lines, in order to reduce as much « as possible the necessity for specialised « staff.

« (*c*) To profit from the renewal of « installations subject to wear and tear « by the employment of more appropriate « installations, brought about by acquir- « ed experience, and modern processes « (use of heavier rails, welding of rails, « transition curves, etc.) or to complete « the equipment of the lines by certain « installations which, in accordance with « the progress of technical science, also « offer better conditions to reach the « proposed end. »

— The Plenary Meeting held on June 11th approved the above summaries.

Revision of the Rules and Regulations of the International Railway Congress Association.

The Permanent Commission has submitted to the Paris Session (1937) a proposal tending to revise the Rules and Regulations.

The aim of this proposal is to facilitate the procedure in connection with the alterations to be made to the list of Countries within the field of action of the Association, and consequently to make the admission of new Members easier.

The list in question is appended to the Rules and Regulations adopted at the London Congress, in 1925, and for any alteration to be made thereto, the same procedure is required as for a modification of the Rules and Regulations themselves.

As a matter of fact, Article 2 laid d that :

The Governments of the countrie which the Association extends may join the Association.

The list of these countries (see ap dix) may be altered by a decision of Congress as laid down by articles 20 and 22, hereinafter.

The Permanent Commission exami by what means these lengthy formal could be avoided in the future, adopted the alterations, given herea to articles 2 and 4, in order to su them to the Plenary Meeting of XIIIth Session.

Present wording.	**Proposed wording.**
Art. 2 — paragraph 4.	
The list of these countries (see appendix) may be altered by a decision of the Congress as laid down by articles 20, 21 and 22 hereinafter.	The list of these countries (see appe may be altered by a decision of the Pe nent Commission, as stated in article
Art. 4 — paragraph 1.	
The Permanent Commission can, by a postal vote, giving a majority of three quarters of the total membership, provisionally alter the list of countries belonging to the Association and of the participating Organisations subject to ratification by the next Congress.	The Permanent Commission can, postal vote, giving a majority of three ters of the total membership, alter th of countries belonging to the Associati
Art. 4 — paragraph 2.	
It has power to arrange for the admission of these Organisation and of Railway Administrations, subject to a written report prepared by a member nominated in each case by the President.	It has power to arrange for the adm of Organisations in a position to belo the Association and of Railway Admin tions, subject to a written report pre by a member nominated in each case b President.

The procedure laid down by Articles 0, 21 and 22 of the Rules and Regulaons, for the revision of the latter, has een followed and the proposals formuled have been approved successively by e Sectional Meetings held during the aris Congress, and the Plenary Meeting eld on June 11th, 1937.

The last formality required, i. e. the written ballot of all the Members of the Association is now in progress.

In compliance with the Rules and Regulations (art. 22) the results of the ballot (which will be closed six months after the closure of the Congress) will be published in the Monthly Bulletin of the Association.

SUMMARY REPORT OF THE DISCUSSIONS AT THE GENERAL MEETINGS

(June 7th and 11th, 1937.)

President : Baron E. de Rothschild.
General Secretaries : Messrs. P. Ghilain, de Boysson and Cambournac.
Assistant General Secretaries : Sir H. Nigel Gresley and Dr. Th. Kittel.

Meeting held on June 7th, 1937.

— The Meeting opened at 9.30, under the presidency of Mr. Henry-Gréard, *Vice-President*.

The Meeting examined the first point on the agenda : *Revision of the Rules and Regulations.*

The President read out the proposed alteration (*) and stated that the Committee whose task it had been to examine the proposal unanimously voted its adoption. This Committee was made up of : Mr. Rulot, *President of the Permanent Commission of the Association* — five Members of the Permanent Commission : Dr. Ing. eh. Dorpmüller *(German Ministry of Communications)*, Mr. F. Fiori *(Italian State Railways)*, Mr. Le Besnerais *(French Nord Railway)*, Lord Rockley *(Southern Railway, Great Britain)*, and Mr. A Schrafl *(Swiss Federal Railways)* — and the following delegates of Section I to V of the 1937 Congress : Sir Ralph Wedgwood *(London and North Eastern Railway — Section I)*, Prof. Dr.-Ing. Wechmann *(German Ministry of Communications — Section II)*, Yoyitch *(Jugoslav State Railways — tion III)*, Prof. Dr.-Ing. A. Wasiut *(Polish State Railways — Section* and Mr. E. Mellini *(Italian State ways — Section V)*.

— No objection being raised, the posal was carried.

The Meeting then passed on to th cond point on the agenda : Examin of the Summaries adopted up to th the various Sections.

Mr. Ghilain, *General Secretary*, out these summaries in succession.

SECTION I.

Question I. — Summaries ad without any remarks.

SECTION II.

Question IV. — Mr. Matter (*Federal Railways)* wished to have t cond sentence of the second paragra Summary 1 worded as follows :

« This future also depends on

(*) See p. 1962 of this *Bulletin*.

mprovements of the track (curves, su-relevation, elimination of rail joints or duction of their number), and espe-ally on the mutual adaptation of the il motor car, operating methods, and affic requirements. »

The President asked if anybody had y objection to this new drafting.

The Presidents of Sections II and III pressed their agreement.

The new wording was consequently rried.

The other articles were approved with-t any observation.

Question V. — The summaries were opted without any observations.

SECTION III.

Question VII. — No objections being sed, the summaries were adopted.

SECTION IV.

Question XI. — As regards Summary I, the President proposed to adopt the wording hereafter for Clause 4 :

« 4. To introduce into their statistics of accidents a more precise qualification of causes due to the human element, conjointly with the result of the psychotechnical examinations of the members of the personnel involved in these accidents. »

Dr. Wasiutynski, *President of Section IV*, supported the amendment proposed by the President. He stated that it corresponded to the exact meaning of the paragraph in question.

The amendment was consequently carried.

— The other summaries were approved without discussion.

— The Meeting was closed at 10 a.m.

Meeting held on June 11th, 1937.

he Meeting was opened at 9.30, Mr. Besnerais, *Vice-President*, being in Chair.

1. *Summaries.*

Ir. Ghilain, *General Secretary*, read the summaries which had been wn up by the Sections, regarding stions II, III, VI, VIII, IX, X, XII XIII.

– These summaries were ratified hout any remarks being made.

2. *Increase in the number of members of the Permanent Commission. Renewal of mandates.*

(a) The President stated that, at its Meeting on May 31st, the Permanent Commission had decided to submit to the Plenary Meeting for approval, the allocation of a mandate of Member of the Permanent Commission to the Argentine Republic.

He recalled to mind the importance of the railway systems of that country, and the excellent relations existing between the various Administrations and the Permanent Commission.

— *This proposal was unanimously approved.*

(b) The President recalled that it is the custom to nominate the President of the Session a life Member of the Permanent Commission. He consequently proposed the appointment of Baron de Rothschild.

— *Approved with loud applause.*

(c) The President stated that the following mandates conferred by the Permanent Commission during the interval between two Sessions (Cairo, 1933, and Paris) were submitted for ratification to the Plenary Meeting :

Appointed on July 29th, 1933 :

Messrs. Rauscher;
Jacobs;
Gufflet;
Osman Bey.

Appointed on July 7th, 1934 :

Messrs. Le Besnerais;
Boutet (replaced);
Mugniot;
Othon de Senn;
Wang;
Bauer;
Djouritchitch (replaced);
Jadot;
Sir Hugh Hannay (replaced);
Messrs. Thomas;
Kittel;
Ramallo;
Kawai (replaced).

Appointed on July 4th, 1935 :

Messrs. Colson, honorary member;
de Ruffi de Ponteves;
Sgoureff;
Pelley;
Lemaire.

Appointed on July 11th, 1936 :

Messrs. Clement;
Nobili;
Tomiyama (replaced);
Ottone;
Pellarin;
Yoyitch;
Surleau;
Grimpret;
de Spirlet.

Appointed on February 27th, 1937

Messrs. Iwamura;
Macovei;
Kradolfer;
Sauer;
Kirkness.

— *Approved with applause.*

(d) The President stated that mandates of the following Member the Permanent Commission had c to an end; these Members accepted renewal of their mandates and were proposed for re-election :

Mr. Le Besnerais;
Lord Rockley;
Messrs. Clement;
da Costa Couvreur;
de Senn;
Jezierski;
Lemaire;
Mange;
Marguerat.
Willard;
Dr.-Ing. eh. Dorpmüller;
Messrs. Fiori;
Kradolfer;
Sir Cyril Hurcomb;

Messrs. JACOBS;
JADOT;
OTTONE;
SAUER;
VAN MANEN;
VELANI;
Sir Ralph WEDGWOOD.

All these Members were re-elected with cheers.

3. *Periodicity of the Sessions of the Congress Association and selection of the places where the next Sessions will be held.*

The PRESIDENT informed the Meeting that two invitations had been received by the Secretariat of the Permanent Commission, with a view to holding the two next Sessions at Tokyo and Berlin respectively. The first was from Japan, asking to hold a Session in 1941; the second was from the German Government, proposing to hold the 15th Session in Berlin, n 1945.

Moreover, a third proposal had been received from Poland, asking that the Permanent Commission meet at Warsaw in 1943, where, as was done at Brussels, in 1935, this Commission, enlarged by a few specialists, could discuss one or two questions of immediate interest.

These proposals were made the subject f discussions by the Permanent Commission, and conversations with the Representatives of the Governments who were good enough to send the different invitations just referred to.

The result was a complete agreement, which can be summed up as follows :

The 14th Session would be held in Berlin in 1941, and the 15th Session at To-yo, in 1945 : meanwhile, an enlarged Meeting of the Permanent Commission would be held at Warsaw, in 1943.

The PRESIDENT asked the Meeting to approve this proposal as a whole, and to rise in order to mark its unanimity. *This was done with loud applause.*

The PRESIDENT then proposed to acclaim the Governments, who, by their invitations, showed their sympathy for the Railway Congress Association. *(Prolonged applause.)*

Mr. MINODA *(Japanese Government)* thanked the Railway Congress for having ratified the proposals made by the President and assured the Members that they would be heartily welcomed in Japan. He hoped that all member Administrations and Governments would be able to send important Delegations. *(Cheers.)*

4. *Various.*

Mr. GHILAIN, *General Secretary*, proposed to express sincere thanks and send congratulations to Mr. BARRIOL (General Secretary of the Paris Statistics Department, Paris) and Sir Henry FOWLER (Chairman of Committee, Ministry of Transport, Great Britain) for the remarkable way in which they audited the accountancy of the 12th Session. *(Applause.)*

Selection of auditors.

The General Secretary proposed to the Meeting to designate Mr. BARRIOL and Sir Nigel GRESLEY (Chief Mechanical Engineer, London and North Eastern Railway) as Auditors for the accounts of the 13th Session.

— *(Approved.)*

— The Meeting was closed at 10.0 a.m.

CLOSURE OF THE SESSION

(June 11th, 1937).

The Meeting opened at 11.0 a.m., Baron E. de Rothschild, *President of the Session,* being in the Chair.

The President, in a very eloquent speech, congratuled Mr. Rulot, *President* of the International Railway Congress Association, and Mr. Ghilain, General Secretary of the Association, as well as all their collaborators, for the brilliant results obtained thanks to the work of the Sections. He also paid homage to the initiative and devotion of all the Members of the Local Committee, who contributed to the perfect organisation of the work of the Congress. *(Loud applause.)*

He recalled the principal questions which were discussed during the Congress, and stressed the particularly happy technical results which had been obtained, thanks to the competency and authority of the personalities who took part in the discussions. *(Applause.)*

He was pleased to state the 13th Session had been quite successful, and then called upon Mr. Rulot, *President of the Association.*

Mr. Rulot thanked Baron de Rothschildt for his kind appreciation, and said how much everybody had been pleased to work during these two weeks under the high presidency of Baron de Rothschild and under the care of the French Organizing Committee. *(Cheers.)*

He paid homage to those who organi
ed the Congress, specially mentionin
besides the President of the Sessio
the able General Secretaries Messr
de Boysson and Cambournac, and the S
cretaries of the Local Commissio
Messrs. Barois and d'Argentré. He e
pressed his gratitude to the Reporters
the different Sections, and all those wh
by their activity and devotion, had ensu
ed the complete success of the prese
Session.

He also thanked the Paris Metropolit
Railway Company and the Société
Transports en commun de la Région P
risienne, for the travelling faciliti
which they offered to the Members
the Congress, and finally, the Gover
ment of the French Republic who besto
ed on the Congress the very great hono
of inviting and welcoming it in such
congenial midst.

The President, Baron de Rothschi
then stated that the time to part h
come, and wished a happy time to
the Members who intended to join t
excursions organised on their behalf, a
a pleasant journey home to those w
were returning at once to their respect
countries.

The President then closed this l
Meeting of the XIIIth Session ami
long and enthousiastic cheers.

List of Members of the Permanent Commission

OF THE

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

after the decisions taken at the Plenary Meeting held on the 11th June 1937 (Art. 6 of the Rules and Regulations.

President :

N. **Rulot** (2), directeur général de la Société Nationale des Chemins de fer belges ; 231, rue Royale, Brussels.

Vice-Presidents :

U. **Lamalle** (1), directeur général adjoint, directeur de l'exploitation à la Société Nationale des Chemins de fer belges ; 17, rue de Louvain, Brussels ;

R. **Le Besnerais** (3), directeur de l'Exploitation de la Compagnie du Chemin de fer du Nord français ; 18, rue de Dunkerque, Paris.

Members of the Executive Committee :

irimpret (1), conseiller d'Etat, vice-président du Conseil supérieur des Travaux publics, président du Conseil de réseau des chemins de fer de l'Etat français ; 20, rue de Rome ; Paris ;

he Right Hon. Lord **Rockley** (3), P.C., G.B.E., Director, Southern Railway ; 2, Cadogan Square, London, S. W. 1 ;

Vickers (2), director, London Midland & Scottish Railway ; Chapel House, Charles Street, Berkeley Square, London, W. 1.

Baron Edouard **de Rothschild**, président du Conseil d'administration de la Compagnie du Chemin de fer du Nord français, président du Comité exécutif des Grands Réseaux de chemins de fer français ; Paris.

Ex-presidents of session, members ex-officio :

E. Ibrahim Fahmy **Kerim** Pasha ; Cairo ;

Members :

The Hon. E. C. G. **Cadogan** (1), C. B., M. P., director, Great Western Railway ; Board Room, Paddington Station, London W. 2 ;

J. **Castiau** (1), secrétaire général du Ministère des Transports de Belgique ; 17a, rue de la Loi, Brussels ;

H. E. Mahmoud **Chaker** Pasha (2), under-secretary of State, General Manager of the Egyptian State Railways ; Cairo ;

M. W. **Clement** (3), president, Pennsylvania Railroad ; Broad Street Station, Philadelphia ;

R. **da Costa Couvreur** (3), ingénieur-inspecteur, secrétaire général au Ministère des Travaux publics et des Communications du Portugal ; Rua Chaby Pinheiro, N° L. V. G., 2, 1°, Lisbon ;

Dautry (2), directeur général des chemins de fer de l'Etat français ; 20, rue de Rome, Paris ;

Sir Francis **Dent** (2), C. V. O., director, Southern Railway (Great Britain) ; Dock House, Beaulieu (Hants), England ;

Baron Edouard **de Rothschild** (already named).

de Ruffi de Pontevès (1), inspecteur général des mines, directeur du contrôle du travail des agents du chemin de fer, Ministère des Travaux publics ; Paris ;

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(1) Retires at the 14th session.
(2) Retires at the 15th session.
(3) Retires at the 16th session.

Dr. Othon **de Senn** (3), secrétaire d'Etat, président de la Direction des Chemins de fer royaux de l'Etat hongrois ; 73, Andràssy ut, Budapest VI ;

de Spirlet (2), inspecteur général des lignes Nord belges ; Liége ;

Dr. Ing. eh. J. **Dorpmüller** (3), Minister of Communications, General Manager of the German State Railways ; 35, Voss-Strasse, Berlin W. 8 ;

F. **Fiori** (3), conseiller d'administration des chemins de fer de l'Etat italien ; Villa Patrizi, Rome ;

Sir Henry **Fowler** (1), K. B. E., chairman of Committee, Ministry of Transport, Great Britain ; Spondon Hall, near Derby ;

P. **Ghilain** (1), ingénieur en chef au Service du Matériel de la Société Nationale des Chemins de fer belges ; 231, rue Royale, Brussels ;

A. **Granholm** (1), directeur général des chemins de fer de l'Etat suédois ; Stockholm ;

Sir H. Nigel **Gresley** (1), K. B. E., D. Sc., chief mechanical engineer, London & North Eastern Railway ; King's Cross Station, London, N. 1 ;

Grimpret (already named) ;

R. J. **Harvey** (2), consulting engineer to the Government of New-Zealand ; 34, Victoria Street, Westminster, London, S. W. 1 ;

A. **Henry-Gréard** (2), directeur de la Compagnie du chemin de fer de Paris à Orléans ; 8, rue de Londres, Paris ;

Sir Cyril **Hurcomb** (3), K. B. E., C. B., secretary to the Ministry of Transport (Great-Britain) ; 6, Whitehall Gardens, London, S. W. 1 ;

Masaru **Iwamura** (1), secretary of the Japanese Ministry of Railways, Manager of the Berlin Office ; 11, von der Heydt Strasse, Berlin W. 35 ;

L. **Jacobs** (3), directeur général de la Société Nationale belge des Chemins de fer Vicinaux ; 14, rue de la Science, Brussels ;

G. **Jadot** (3), directeur du Service des Finances de la Société Nationale des Chemins de fer belges ; 21, rue de Louvain, Brussels ;

H. **Jezierski** (3), conseiller ministériel au Ministère des Communications de Pologne ; Warsaw ;

E. **Kejr** (2), ingénieur, conseiller ministériel chef du département V/5 au Ministère de chemins de fer de Tchécoslovaquie ; Prague

H. E. Ibrahim Fahmy **Kerim** Pasha (alread named) ;

L. H. **Kirkness** (2), secretary to the Railwa Board (India) ; Simla ;

Dr. Th. **Kittel** (1), Reichsbahndirektor, Deutsch Reichsbahn ; 35, Voss-Strasse, Berlin, W. 8

P. **Knutzen** (2), directeur général des Chemin de fer de l'Etat danois ; 40, Sölvgade, Copen hagen, K. ;

Kradolfer (3), directeur de l'Office fédéral d transports de la Confédération suisse ; Berne

U. **Lamalle** (already named) ;

R. **Le Besnerais** (already named) ;

C. **Lemaire** (3), directeur du Service de la Vo de la Société Nationale des Chemins de f belges ; 17, rue de Louvain, Brussels ;

L. F. **Loree** (2), president, Delaware & Huds Railroad ; 32, Nassau Street, New York Cit

Ion **Macovei** (1), inspecteur général, directe général des Chemins de fer de l'Etat roumai Bucharest ;

A. **Mange** (3), administrateur de la Compag du chemin de fer de Paris à Orléans, p sident du Comité de gérance de l'Uni internationale des chemins de fer ; 42, rue la Bienfaisance, Paris ;

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(1) Retires at the 14th session.
(2) Retires at the 15th session.
(3) Retires at the 16th session.

. **Marguerat** (3), directeur des Compagnies de chemins de fer de Viège à Zermatt, Furka-Oberalp, Gornergrat et Schöllenen; Lausanne;

. **Maristany** (2), marquis d'Argentera, directeur général de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante; Estación de Atocha, Madrid;

. **Moralès** (1), vice-président du Conseil supérieur des chemins de fer d'Espagne, président du Conseil d'administration des chemins de fer de l'Ouest de l'Espagne; Estación de las Delicias, Madrid;

. **Moreno Ossorio** (3), administrateur à la Commission permanente du Comité exécutif des Chemins de fer du Nord de l'Espagne; Estación del Norte, Madrid;

. **Mugniot** (2), directeur général de la Compagnie des Chemins de fer de Paris à Lyon et à la Méditerranée; 88, rue St-Lazare, Paris (9e);

. **Nobili** (2), ingénieur, vice-directeur général des Chemins de fer de l'Etat italien; Rome;

. E. Mohamed **Osman** Bey (2), under secretary of State, Egyptian Ministry of Communications; Cairo;

. **Ottone** (3), president of the Federazione Nazionale Fascista degli Esercenti Imprese ferroviarie, Tramviarie e di Navigazione interna; 115, Piazza Montecitorio, Rome;

ellarin (1), directeur de la Compagnie des Chemins de fer de l'Est français; 21-23, rue d'Alsace, Paris;

J. **Pelley** (2), president, Association of American Railroads, Transportation Building; Washington D. C.;

Ramallo (1), ingénieur, director del Instituto le Economia de los Transportes, Facultad Nacional de Ciencias Económicas; Buenos Ayres;

Dr. W. **Rauscher** (1), conseiller ministériel, directeur commercial des Chemins de fer fédéraux autrichiens; Vienna;

The Right Hon. Lord **Rockley**, P. C., G. B. E. (already named);

N. **Rulot** (already named);

Sauer (3), Ministerialrat, Reichsverkehrsministerium; 80, Wilhelmstrasse, Berlin W. 8;

A. **Schrafl** (1), président de la Direction générale des Chemins de fer fédéraux suisses; Berne;

G. **Sgoureff** (1), ingénieur, directeur général adjoint des Chemins de fer et des Ports de l'Etat bulgare; Sofia;

Sir Josiah **Stamp** (1), G. B. E., D. Sc., chairman and president of the Executive, London Midland & Scottish Railway; Euston Station, London N. W. 1;

Surleau (1), directeur des Chemins de fer d'Alsace et de Lorraine; 3, boulevard du Président Wilson; Strasbourg;

T. C. **Swallow** (2), advisory engineer, Office of the High Commissioner for the Union of South Africa; South Africa House, Trafalgar Square, London, W. C. 2;

R. E. **Thomas** (2), deputy general manager, Egyptian State Railways; Cairo;

Antonio **Valenciano y Mazerès** (1), inspecteur général des ponts et chaussées, administrateur de la Compagnie des Chemins de fer de Madrid à Saragosse et à Alicante; 5-3°, General Oraâ, Madrid;

H. **van Manen** (3), directeur des Chemins de fer néerlandais; Utrecht;

Th. M. B. **van Marle** (2), inspecteur-generaal van het Verkeer, Rijksverkeersinspectie; The Hague;

L. **Velani** (3), directeur général des Chemins de fer de l'Etat italien; Villa Patrizi, Rome;

) Retires at the 14th session.

) Retires at the 15th session.

) Retires at the 16th session.

A. M. M. **Verkoyen** (²), directeur du Service du matériel de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Brussels;

D. **Vickers** (already named);

Dr. C. C. **Wang** (¹), representative of the Chinese Ministry of Railways, 21, Tothill Street, Westminster, London, S. W. 1;

Sir Ralph Lewis **Wedgwood** (³), C.B., C.M.G., chief general manager, London & North Eastern Railway; King's Cross Station, London, N. 1;

D. **Willard** (³), chairman of the Board, Association of American Railroads; president, Baltimore et Ohio Railroad; Baltimore, Md.;

M. **Yoyitch** (¹), directeur général adjoint des Chemins de fer de l'Etat yougoslave; Belgrade;

N... (³) (Argentina);

N... (¹) (Brazil);

N... (¹) (Germany);

N... (²) (Germany);

N... (²) (Germany).

Honorary member : C. **Colson,** membre de l'Institut, inspecteur général des Ponts et Chaussées, vice-président honoraire du Conseil d'Etat de France, membre du Conseil supérieur des Chemins de fer de France; 2, rue de Laplanche, Paris.

SECRETARY'S OFFICE : 231, rue Royale, Brussels.

General secretary : P. **Ghilain** (already named).

Assistant secretaries : A. W. **Chantrell,** ingénieur principal au Service du Matériel de la Société Nationale des Chemins de fer belges;

J. **Dubus,** ingénieur au Service de la Voie de la Société National des Chemins de fer belges;

E. **Minsart,** ingénieur principal au Service du Matériel de la Sociét Nationale des Chemins de fer belges.

(¹) Retires at the 14th session.
(²) Retires at the 15th session.
(³) Retires at the 16th session

RECEPTIONS, VISITS AND EXCURSIONS

Quite a number of receptions, visits and cursions were organized in honour of the elegates to the Paris Congress by the ench Local Committee.

The following are the principal ones.

1. Sight seeing trips and teas in Paris.

On *June 4th, 5th, 7th, 8th, 9th and 10th* ips through Paris by motor coach were ganized especially for the ladies accomnying the Delegates, in three circuits, each vering different districts of the Capital.

On *June 4th, 7th, 8th, 9th and 10th* the dies were invited to visit several of the ading Paris dress-makers' establishments. A particularly friendly welcome was exnded by the most famous dressmakers, veral of them organizing special displays models at 11 o'clock in the morning d 3 o'clock in the afternoon.

On *June 8th* a visit to the Louvre Picture llery was made by night, during which ngressists were able to contemplate the rvellous exhibits of this famous Museum der a quite novel aspect.

On *June 7th and 8th,* the Delegates and ir families were invited to the Algerian villon at the Paris Exhibition, one of the st picturesque of the Colonial Section, ilt on the Ile des Cygnes. The midst in ich the guests were received, the music which they listened and even the refreshnts which were offered to them created most attractive colonial surrounding.

Finally, on *June 11th,* a tea party was ered to the Congressists in the Bois de ulogne.

The organisers of the Congress thought it uld be pleasant for the Delegates and ir families to enjoy a few hours rest and m before leaving Paris to set out on the ious excursions lasting several days ough France.

Tea was therefore served from 4 to 6 p.m. the restaurant of the Croix-Catelan Parc, situated in the private enclosure of the Racing Club de France, one of the oldest and most famous sporting Societies in France.

2. Technical visits.

(a) *Vitry locomotive test plant.*
Arrighi power station.
220 000-volt Chevilly station.

On *June 1, 3 and 10th,* the Delegates visited the locomotive test plant at Vitry-sur-Seine, as well as the Arrighi Central Power Station and the 220 000-volt station at Chevilly.

The visit of the locomotive test plant was of quite special interest, as it was connected with one of the questions discussed during the Congress. Delegates were able to see how this test plant enables a locomotive held in place to develop the complete range of powers which may be expected from it, and consequently makes it possible to study how the boiler and motion of a locomotive behave at the various working speeds, according as to whether it is made to apply a greater or lesser tractive effort on the drawbar hook.

Also, the new *Arrighi power station* (Vitry-Sud), which was put into service in the course of the year 1931 and is an object of interest to technicians from all countries, provided a very interesting visit for the Congressists.

And finally, the Delegates were enabled to visit the *Chevilly station* which provides a junction for the main leads at 220 kV. and 90 kV. coming from the centre of France, with the 60-kV. network of the Paris district. This station thus forms a connection between the hydraulic power stations in the Centre of France and the large steam power stations in the Paris district, interconnected moreover with the ampere station (Saint-Denis), with the hydraulic power stations on the Rhine, in the Jura and in the Alps.

(b) *Printing Works of the « Illustration » at Bobigny. Le Bourget shunting yard.*

On *June 10th,* a visit was made to the printing works of the French paper « L'Illustration », at Bobigny, and to the shunting yard station of the French Nord Railway Company at Le Bourget.

The new works at Bobigny, where this great weekly magazine known all over the word is printed, is a remarkable example of the results that can be obtained from machinery, both for labour saving and for creating really artistic and accurate reproductions. The methods used for the automatic setting up of the type and for printing the plates were of great interest to, not only to the Congressists, but also to the ladies accompanying them.

Finally, technicians interested in shunting yards were carried by railcar to Le Bourget, the most important marshalling yard on the French Nord Railway. They inspected its up-to-date installations, and in particular two electrical point-operating cabins, a Deloison slipper brake operating cabin, and a splitting-up hump whence the engines are controlled by wireless.

(c) *Gare de l'Est. The Vaires shunting yard.*

On *June 3rd and 8th,* the Congressists were invited to inspect the Paris Est terminal and the Vaires shunting yard.

Since its complete transformation, and its enlargements undertaken after the War and completed in 1931, the Gare de l'Est is one of the most modern and spacious stations.

The Vaires shunting yard, which was visited next, is situated 14 miles away from Paris and is remarkable for its area (2.2 miles long by about 0.6 mile wide) and the importance of its installations.

(d) *Gare Saint-Lazare (centralized traffic control).*

On *June 3rd and 8th,* there was arranged, on behalf of the Congressists, a visit to the centralized traffic control plant of the Gare Saint-Lazare.

The centralized control, applied to a three-track section of the Paris-Havre line, between the stations of Houilles-Carrières-sur-Seine and Sartrouville (1.9 miles), represents one of the first applications on the Continent of « integral dispatching ». This application to a much used line, carrying considerable suburban traffic and having traffic peaks in a given direction but varying according to the time of the day, has made it possible to obtain a very flexible operation, by laying in between the two tracks of the existing main line a single track on which trains are run in eithe direction according to the needs of th service.

(e) *Psychotechnical laboratory of the Sociét des Transports en Commun de la Régio parisienne.*

On *June 1st, 4th, 8th and 10th* visits wer paid to the psychotechnical laboratory of th Société des Transports en Commun de l Région parisienne.

The Congressists were received in the larg collective examination room, where th installation was briefly described as a whol They then went through the various room where the apparatus for the different tes are located and were shown in service. Th visit was concluded with the examination o the bus driver's stand, fitted with all th control devices, and in front of which a fil is unrolled, showing the various happenin occurring in the street, and which the driv has to meet by working the appropria devices.

(f) *The Landy rolling stock maintenance yard and La Chapelle depot.*

On *June 1st and 8th* the French No Railway Company organized a visit to t rolling stock depot at Landy and one at t La Chapelle locomotive depot.

The congressists were particularly interes ed there in the up-to-date plant, on stoc adings and inspection pits, recently erect at Landy for the inspection, light repai ıd re-marshalling of passenger trains arriv- g in Paris.

An old-time train composed of rolling ock dating back to 1845-1860 took the visi- rs from Landy to the depot of La Cha- elle, where they examined the inspection ıd maintenance installations for steam comotives working fast trains from Paris, well as the shed, the lifting and mainten- ıce workshops, and the fuel oil refilling ation for railcars, and particularly the iplets working the high-speed Paris to ille, Brussels and Liége services.

) *Permanent-way shops at Moulin-Neuf.*

On *June 4th and 10th*, the Delegates to the ıris Congress visited the permanent-way orkshops and stores of the French Nord ıilway at Moulin-Neuf.

These workshops are certainly among the rgest and most modern installations of their nd existing in Europe : they cover a total ea of 162 acres, of which 7 acres are cupied by the buildings, and are served by network of 25 miles of railway track; they ve a double purpose : construction of new lling stock and reconditioning of old plant; ey are provided with up-to-date equip- ent of a high efficiency, and a very ela- rate labour organisation.

) *The new Versailles-Chantiers station.*

Finally, on *June 4th and 10th*, the Con- essists were invited to visit the new station d signal box at Versailles-Chantiers.

The new Versailles-Chantiers station is a del of modern organisation and of util- tion of a restricted area with a not very propriate profile. The architecture is tched with the local historical buildings.

t possesses an electrical signal box with te levers, the combinator of which com- ses 130 levers.

3. Short excursions.

everal excursions of this kind were offer- to Delegates to the Paris Congress, each them having a particular kind of charm l interest of its own.

(a) *Excursion to the Chevreuse Valley.*

This excursion enabled Congressists to admire the natural beauties and historical sites which abound in the Ile de France. It took place on June 10th, and the itinerary first of all followed the Exhibition, then an underground passage between the Iéna Bridge and the Trocadéro and thence to the Porte de St-Cloud, recently re-arranged and decorated with two monumental fountains, the work of the sculptor Landowski. When crossing the Seine, the visitors gained a fine view of the St-Cloud hillside and the Bois de Meudon; they next went through Sèvres, Chaville and Viroflay and finally arrived at the Château de Versailles, and leaving this castle on the right hand, reached the Satory plateau, then Guyancourt and Voisins-le-Bretonneux.

The excursion continued through the Port-Royal ravine, near the site of the Port-Royal des Champs abbey, and reached Dampierre, where the castle was visited.

After Dampierre the route was through the « Bouillons de Cernay » and arrived at Vaux de Cernay, where the ruins of a Cistercian abbey founded in 1128 was visited.

The excursionists returned via Chevreuse, below the ruins of the Chateau de la Madeleine and then following the Yvette Valley and the Bièvre Valley, returned to Paris via the Châtillon plateau.

(b) *Excursion to the Parc de Sceaux, and French Railwaymen's Sports Meeting, on June 4th.*

This excursion took the Delegates through the populous southern suburbs of Paris into one of the most beautiful sites of the Ile de France : the domain of Sceaux, recently restored and still little known.

This is a royal park with its thickets, lawns, waterfalls and ponds. It is also a sort of museum where the visitors had the pleasure of discovering souvenirs from the times when its successive owners lived there : Colbert, Louis XIV, the Duchesse du Maine, the artists Perrault, Lebrun, Lenôtre, Coysevox, etc.

After seeing the domain of Sceaux, the guests reached Croix-de-Berny, an old racing stable near a formerly famous racecourse, now turned by the Paris Metropolitan Railway Company into a park in which its large staff can practise sports.

They attended a fête of the Sports Union of French Railwaymen, in the course of which a number of athletic, basket ball, tennis, swimming, pelota, etc... matches were played; finally the pupils of the Schools for apprentices of the Main-Line Railways and the Société des Transports en Commun de la Région parisienne gave interesting exhibits of physical culture. A lunch was offered by the Paris Metropolitain Railway Company, during which Delegates listened to the performance of the excellent brass and reed band « Harmonie du Chemin de fer du Nord ».

(c) *Excursions to Versailles and St-Germain, June 5th and 12th.*

The French State Railways organized, on behalf of the Congressists and their families, a very interesting excursion to Versailles and St-Germain-en-Laye, in the course of which the Members were able to admire the famous castles in the setting of the marvellous parks which surround them.

The Château de Saint-Germain-en-Laye is one of the purest specimens of Renaissance architecture, whereas that of Versailles is one of the largest and most majestic architectural ensembles in the world.

(d) *Excursions to Fontainebleau, 5th and 12th June.*

On the same days, other groups of Congressists were able to visit Fontainebleau, its marvellous palace and wonderful forest. On each occasion, Congressists were divided in two groups. While one group went through the castle, the other made a motor trip of about 20 miles during which they could admire the forest under its most beautiful aspects.

(e) *Excursions to the Castles on the Loire, June 5th, 8th and 10th.*

The departure of these excursions was timed for 10.30 a.m. (with luncheon serve in the train), and in the afternoon mot coaches took the visitors to three of t largest castles on the Loire : *Chenonceaux,* graceful Renaissance structure situated on bridge in the middle of the river Che *Amboise,* dominating the Loire with its lord mass; *Blois,* the architecture of which dat back mainly to the fine epochs of Louis X and François I^{er}, and where some gre events of the Renaissance took place.

(f) *Excursions to Pierrefonds and Compièg June 5th and 12th.*

These two excursions were particula appreciated by the Delegates and their fa ilies who visited the two residences of Pi refonds and Compiègne, which are favour places for those who are fond of art, sp or a quiet place of rest.

At Pierrefonds, the visitors admired t imposing old fortified castle, built in t Middle Ages, and very cleverly restored Viollet-le-Duc.

After a motor drive through the fore the excursionists proceeded to Compiè where they visited the palace which is abo all remarkable for its rich interiors. Visit were reminded of the many historical so venirs connected with this beautiful resi ence.

(g) *Race-meeting at Chantilly, June 6th*

The « Société d'Encouragement p l'Amélioration de la Race Chevaline » invi the Delegates and their families to attend meeting on June 6th, at Chantilly, dur which there was run the « Prix de Diane one of the most famous horse races in Fra

The Chantilly racecourse, located in mirable surroundings, near one of the m beautiful castles of the Ile de France. on such a day the meeting place of the m fashionable members of Parisian soci Congressists attended this meeting in pa cularly large numbers; they were able witness, on both the outward and ret journeys, the very frequent special t service run by the French Nord Rail on the occasion of such race meetings.

Official banquet given by the French Main-Line Railways. — View of the table of honour.

Official banquet given by the

Railways. — General view.

Official banquet given by the French Main-Line Railways. — Another view of the table of honour.

(h) *Visit of the liner « Normandie », June 8th.*

The State Railways and the Compagnie énérale Transatlantique invited the Conressists and their families to inspect at avre one of the largest liners in the world, hich at present holds the Blue Riband of e Atlantic.

This excursion also gave the delegates an pportunity to inspect the transatlantic ation at Havre, and its arrangements.

But if the object of this excursion provided very particular attraction, the journey itself as particularly pleasant for the would be sea passengers », who embarked at the int-Lazare station in the very Pullman rs used by the Railway Company for eir transatlantic boat trains, and they thus d the illusion of really starting out upon transatlantic journey.

4. Various receptions.

Evening at the Opera, June 2nd.

On *June 2nd* the delegates to the Paris ngress and their families were invited to end a gala evening at the Opera.

This famous Palace of the National Music d Dance Academy had its fête day aspect, d the crowd which passed to and fro on the numental staircase and the foyer, quite ently restored and embellished, was not king in its admiration of the luxurious rroundings, to which a further touch of ouring was added by the charming gowns rn by the ladies accompanying the Deates.

The programme included the « Damnation Faust », a dramatic legend in 4 acts by ctor Berlioz, followed by a Suite of nces, some famous members of the corps ballet of the Opera being among the formers.

Official banquet given by the French Main-Line Railways.

n *June 7th,* there was given an official nquet by the French Main-Line Railway mpanies.

Over 1 200 guests attended. The banquet took place in the vast hall of the Palais des Sports, specially arranged for the occasion and abundantly decorated with hangings and flowers.

It was presided by Mr. BEDOUCE, French Minister for Public Works, who had at his right hand, at the table d'honneur, Mr. RULOT, President of the International Railway Congress Association, and on his left hand, Baron E. DE ROTHSCHILD, President of the Executive Committee of the French Main-Line Railways, and President of the Paris Session.

Several speeches were made, notably by Baron de Rothschild, in the name of the French Railways, and by Mr. Rulot, on behalf of the International Railway Congress Association.

On this occasion some decorations were awarded to various French and Belgian personalities who had taken part in the work of the Congress or had granted their patronage to same.

The banquet was a real success and the greatest cordiality reigned throughout the evening.

Garden Party at the Elysée Palace, on June, 9th.

On *June 9th,* the Congressists were invited to a garden party at the Elysée Palace.

This party, in the course of which the President of the Republic and Madame LEBRUN paid the Members the great honour of receiving them, was a most distinguished gathering, and the congressists were welcomed in a charming way.

After the usual introductions the guests strolled through the wonderful gardens, called there by the strains of a picked orchestra. In the shade of the large trees and amidst beautiful lawns and flower beds the guests rested awhile before wending their way to a copious buffet which had been provided for them.

Owing to the kindness of their hosts, the Congressists also had the opportunity of visiting the magnificent rooms of the Elysée and admiring the many works of art which they contain.

5. Excursions lasting several days, at the conclusion of the Congress.

Six excursions carefully arranged by the French Local Organizing Committee, and each covering one of the most picturesque and interesting parts of touristic France, were provided for the delegates at the conclusion of the Congress.

Congressists had the option of selecting themselves the excursion which appealed most to them, and no pains were spared to meet the wishes and tastes of everyone.

We give below a short description of each of the excursions in question.

EXCURSION No. 1.

Côte d'Argent and Pyrenees.

The departure for this excursion took place on Friday June, 11th, in the evening, by special train from which the delegates disembarked the following morning at the station of the port of call of Verdon, which forms part of the installations of the autonomous port of Bordeaux.

Another train was then taken to Arcachon, where breakfast was served, and the guests then proceeded via Saint-Vincent-de-Tyrosse to that charming watering place, Biarritz.

The journey continued, on June 13th and 14th, by a motor trip from Biarritz to Luchon via Pau, Lourdes, Cauterets and the high passes of the Pyrenees range.

EXCURSION No. 2.

Paris-Nice-Chamonix.

The « Route des Alpes ».

The trip over the « Route des Alpes » by motor coach is one of the creations of the Paris-Lyons-Mediterranean Railway Company.

This Company wished to place the most beautiful sites in the French Alps within the reach of all. Where the rail could not go, motor coach services were created to prolong it. The first regular service of this kind was organized in the Tarantaise in 1905, viz. in the first years after the advent of automobiles. Gradually, new routes were added and on July 4th, 1911, the « Route des Alpes » was opened from end to end. It now stretches over a distance of about 435 miles between Nice and Evian (362 miles forming the circuit covered by congressists). It is truly a wonderful route, enabling tourists to comfortably travel by motor coach along the whole ridge of the French Alps, from the Lake of Geneva to the Mediterranean.

The departure for this excursion took place on June 11th, by two special trains, from Paris to Marseilles and Nice, where th guests arrived the next morning towards 11.3

After a free afternoon spent at Nice, a star was made on the Sunday morning on th long run over the Route des Alpes, in thre stages : Nice to Briançon, Briançon to Aix les-Bains, and finally Aix-les-Bains t Chamonix.

A halt was made in each of these thre towns and the guests arrived at Chamoni at 6.30 p.m., at the end of the 3rd stage c this magnificent circuit.

EXCURSION No. 3.

The Vosges and Alsace.

The Delegates left Paris (Gare de l'Est) o June 12th, at 11 a.m. for Vittel by specia train.

During the course of this journey the trai travelled, from Paris to Langres, over th Paris-Basle main-line, built from 1845 to 186 which has many gradients and comprises large number of bridges and other structur the most important of which is the Chau mont viaduct.

The night was spent at Vittel, and th journey continued next day by railcar fro Vittel to Gerardmer, and thence by mot coach to Colmar.

At Gerardmer, the mountains, the mo touristic part of the excursion, were reache these continuing to Colmar, where structur of the Renaissance style are mixed wi those of XVIIIth century French style, a the pure Alsatian houses with their hi indented gables.

On the third day, the excursion end

ith the run from Colmar to Strasbourg by otor coach, passing through several pretty immer resorts such as Ribeauville, Selestat, bernai, etc., and finally reaching Stras- urg, the metropolis of Alsace.

EXCURSION No. 4.

Brittany.

This excursion, planned and organized y the French State Railways, included e most interesting parts of Normandy d Brittany.

The departure took place on *June 12th*, d the successive stages planned enabled e excursionists to visit Caen a mediæval wn, which possesses remarkable buildings the Romantic style: the Abbaye-aux- ames and the Abbaye-aux-Hommes. A rious feature is its quaint narrow streets, rdered by old timbered houses with woo- n gables and overhanging windows.

A visit was also paid to the Mont Saint- ichel, the famous granitic rock having a rth of 900 metres and a height of 80 metres, pped by an abbey which is one of the ost priceless relics of XIIIth century Nor- an architecture.

On June 13th, the visitors reached Saint- alo, and then Dinard on the opposite side the mouth of the river Rance.

Finally, on *June 14th and 15th* the northern ast of Brittany unfolded before the eyes the excursionists its rows of granite rocks, th little golden sandy beaches nestling in ch bay.

Brest harbour was the terminus of this e excursion.

EXCURSION No. 5.

Vichy, Auvergne, and Pyrenees.

The departure for this excursion took place *June 12th*, by a special Pullman-car train, m Paris for Vichy, which was reached vards 8 p.m.

The next day a drive by motor coach carried the delegates from Vichy to Aurillac, with a stop at Mont-Dore, where lunch was served, and to Marèges, where the guests saw, on the Dordogne, one of the finest dams in France.

From Aurillac to Lourdes the journey was performed by sleeping-car, and the 14th and 15th June were taken up by a visit to Lourdes and excursions around this well known centre for pilgrimages, winding up with the drive by motor coach from Lourdes to Biarritz via Pau.

EXCURSION No. 6.

Paris — Riviera.

This excursion commenced on Sunday June, 13th, the departure being by special all-sleeping car train from the Gare de Lyon.

The train deposited the Delegates next morning at about 8 o'clock at Avignon, where breakfast was served, and at 9 o'clock motor coaches called to take the excursionists through Provence.

The road included colourful and bright landscapes, some imposing sites and vestiges of art recalling their glorious past. Arles was then visited, and lunch offered there.

After a stop at Martigues for tea, the journey continued along the lake called « Etang de Berre » and finally reached Marseilles in the evening.

On the following day, *June, 15th*, after a day spent in Marseilles, the special train deposited the guests at Nice.

Most of the delegates took advantage of their stay at Nice to take drives along the beautiful Corniche roads, to other famous touristic centres of the Riviera.

Before their eyes there constantly unfolded themselves, along an ideally blue sea, avenues, gardens and banks of flowers amidst which lay hidden villas and hotels; they drove past straggling villages dating back to the Middle Ages, and whose ancient vestiges rub shoulders with the most modern structures.